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THE PHILIPPINE
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NEUROPTEROID INSECTS OF THE PHILIPPINE ISLANDS

By NATHAN BANKS
(*Washington, D. C.*)

TWO PLATES

A few years ago not a dozen species of neuropteroid insects were known from the Philippines. A few were collected by Semper and described by Brauer, and Navas and Weele have added two or three.

In the past few years Prof. Charles Fuller Baker has sent me specimens representing about seventy-five species of insects of these orders. In a preliminary report[1] I described a number of new species and recorded others. Professor Baker has desired that a synopsis be published in the Philippines to encourage local students, and the following is presented, although I recognize that it does not cover one third, probably not one fifth, of the species to be found in the Philippines. Nearly all the material is from Los Baños, Laguna Province, Luzon, or from near-by territory.

In the generic tables I have included some genera not yet recorded from the Philippine Islands, which from their known distribution may be expected to occur there, but doubtless unexpected as well as new genera will be found in future collections.

The Odonata, or dragon flies, are not included in this paper. The only island in Insulinde whose neuropteroid fauna is at all well known is Java. It differs from that of the Philippines in the presence of Megaloptera and Mecoptera, and even if these are later discovered in the Philippines, they certainly are not as common as in Java. The species known also from Java are such as are also known from Celebes, or generally distributed in Malasia. There is nothing to indicate any relation to the true Australian fauna; in fact, nearly all the genera are well known in India or southeastern Asia. There is no trace of the genera that ally India and Ceylon to Africa. Many of the psocid genera are known also from Borneo.

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[1] *Proc. Ent. Soc. Washington* (1913), 15, 170–180.

Key to the orders.

a^1. Wings with a nodus, or strong cross vein near middle of costa, interrupting the venation; wings densely net-veined; no palpi, antennæ very small.......... Odonata.
a^2. No nodus present.
  b^1. Tarsi five-jointed.
    c^1. Hind wings with a folded anal area; antennæ never capitate.
      d^1. Mandibles and maxillæ imperfect; wings with few cross veins; pronotum small; wings plainly hairy.......... Trichoptera.
      d^2. Mandibles and maxillæ developed; wings not hairy and with many cross veins; pronotum prominent.......... Megaloptera.
    c^2. Hind wings without a folded anal area; wings not noticeably hairy; mouth parts well developed.
      e^1. Head prolonged in beak beneath; pronotum small; wings with few cross veins.......... Mecoptera.
      e^2. Head not so prolonged; pronotum distinct; usually many cross veins in wings.......... Neuroptera.
  b^2. Tarsi with fewer than five joints.
    f^1. Antennæ minute; abdomen with long terminal setæ; fore wings much larger than hind wings.......... Anisoptera.
    f^2. Antennæ long.
      g^1. Tarsi with four joints; only costal venation distinct, setæ very short .... Isoptera.
      g^2. Tarsi two- or three-jointed; venation developed all over wing.
        h^1. No terminal setæ; pronotum small; wings with few veins; no folded anal area to hind wings.......... Corrodentia.
        h^2. With terminal setæ to abdomen; pronotum distinct; a folded anal area to hind wings.......... Plecoptera.

ISOPTERA

Key to the families.

a^1. Tarsi of three joints, basal joint of front tarsi swollen; pronotum with a transverse suture.......... Embidæ.
a^2. Tarsi of four joints, basal joint not swollen; no transverse suture to pronotum .... Termitidæ.

TERMITIDÆ

Several species of white ants have been recorded from the Islands, and doubtless twenty or thirty occur; the only one received is a large dark-winged male *Termes*. Six new species of Philippine termites collected by Baker, and one new species collected in Manila by Mr. P. Kanehira, government forester of Formosa, have been described by Oshima.[2]

EMBIDÆ

Oligotoma saundersi Westwood.

The only species of this family so far received is *Oligotoma saundersi* Westwood. Two specimens from Mount Maquiling, Luzon. It is a brownish species with pale streaks in the wings. It is widely distributed and extends to India, Africa, and Australia.

CORRODENTIA

This order includes the family Psocidæ, or bark lice. Numerous genera have been described or recorded from the Malay region by Enderlein. Those known from the Islands may be tabulated as follows:

PSOCIDÆ

Key to the genera.

a^1. Wings more or less net-veined beyond the middle; head very broad. **Calopsocus.**
a^2. Wings not net-veined.
b^1. Wings acute at tips and clothed with scalelike hairs.... **Amphientomum.**
b^2. Wings without scalelike hairs.
c^1. A closed discal cell.
d^1. Stigma very long and slender.. **Tæniostigma.**
d^2. Stigma normal.
e^1. Tarsi three-jointed; wings more or less densely dotted with brown .... **Myopsocus.**
e^2. Tarsi two-jointed; wings not dotted with brown.
f^1. Radius and median united for at least one point............ **Psocus.**
f^2. Radius and median not united; connected by a cross vein. **Amphigerontia.**
c^2. No closed discal cell.
g^1. Stigma with a short spur behind.................................... **Amphipsocus.**
g^2. Stigma without a spur.
h^1. Radius and median vein not united, but connected by a cross vein; stigma and areola postica elongate.................. **Epipsocus.**
h^2. Radius and median united at least at one point.
i^1. Stigma very long, like *Tæniostigma*...................... **Tagalopsocus.**
i^2. Stigma of moderate length.
j^1. Areola postica very high.. **Kolbea.**
j^2. Areola postica moderate.
k^1. Basal joints of antennæ elongate and enlarged; venation aberrant .... **Dypsocus.**
k^2. Basal joints of antennæ neither elongate nor enlarged. **Cæcilius.**

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[2] *Annot. Zool. Japon.* (1914), 8.

Calopsocus rizali sp. nov. Plate I, figs. 1 and 2.

Yellowish; antennæ blackish, except basal joints pale, tips of palpi black; thorax unspotted; legs pale, tibiæ infuscated or nearly black. Wings uniform pale brown; venation irregular, usually the radius is not as evenly three-branched as in the figure. Venation of hind wings much like that of *C. infelix,* but the upper fork much shorter than the lower one. Antennæ with long hairs on basal parts; head broad, the vertex with a deep median indentation, the lobes higher than the eyes. Wings longer than in *C. infelix;* the area beyond the stigma bent downward.

Length to tip of wings, 4.3 millimeters.

LUZON, Tayabas, Malinao (*Baker*).

Genus PSOCUS Linnæus

Key to the species.

*a*¹. Stigma angulate behind; second and third posterior cells mostly pale. **bakeri.**

*a*². Stigma rounded behind, second and third posterior cells mostly dark. **taprobanes var. luzonensis.**

Psocus bakeri Banks.

Numerous specimens from Los Baños.

Psocus taprobanes var. luzonensis var. nov.

Agrees very closely with Enderlein's figure of variety *bengalensis,* but the fork of the radius contains only three dark dots, the basal band extends up to the radius, a pale spot at base of second posterior cell only, the white marginal spots cover the marginal vein, and between them the margin is much darker than elsewhere. The stigma is broader than he figures, but not quite angulate behind; the radial fork is much longer than he figures, being fully as far basal as the first fork of the median vein, and its pedicel is not as long as the outer side of discal cell. Head pale; nasus faintly lineate; thorax pale; all tarsi black on last joint and dark at tip of tibia.

Length to tip of wings, 6 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*).

True *P. taprobanes* is found in Java, Ceylon, and doubtless in other islands.

Amphigerontia sp.

A black-winged specimen of this genus from Mount Banahao is in too poor condition for description.

Genus MYOPSOCUS Hagerdorn

Key to the species.

a^1. Stigma twice as long as broad, angulate behind; larger species. enderleini.

a^2. Stigma not twice as long as broad; smaller species........................ bakeri.

Myopsocus enderleini Banks.

Several specimens from Los Baños, Luzon, and Puerto Princesa, Palawan.

Myopsocus bakeri sp. nov. Plate I, fig. 3.

Pale yellowish, lateral lobes of mesonotum with several small dark spots; legs dark at tips of the tibiæ. Wings brown, mostly pale brown on basal half, and mostly darker brown on the apical half; an oblique apical brown band over the posterior cells, its inner edge marked by three pairs of black dots; stigma mostly brown, blackish near base; areola postica brown, a blackish mark at upper side near the median; a broad, oblique, brown band across basal part of wing, its edges with a few black dots; dark clouds elsewhere on wing, so that only small spaces are pale; the brown guttated in appearance, the margin of wing alternately brown and hyaline. The wing seen from side view is strongly undulate on upper (hind) margin. Hind wing slightly darkened at tip, venation dark; upper branch of fork reaching nearly to tip of wing.

Length to tip of wings, 4 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*).

Tæniostigma bimaculata Banks.

From Los Baños and Mount Maquiling, Luzon, and Puerto Princesa, Palawan.

Genus EPIPSOCUS Hagerdorn

Key to the species.

a^1. Wings unmarked .... inornatus.

a^2. Wings with several brown clouds.. completus.

Epipsocus inornatus sp. nov. Plate I, fig. 4.

Body, legs, and antennæ pale yellowish; wings also faintly, uniformly yellowish and with a uniform yellowish venation, no dots on the veins, nor any marks on the wings; fore wings very long and slender, more so than in *E. marginatus* Enderl., barely wider in stigmal area; pterostigma long and slender and tapering toward tip; areola postica long and tapering toward tip; forking of radial vein but little beyond the first forking of median vein; cross vein between radius and medius oblique and fully as long as width of the stigma.

Length to tip of wings, 3.8 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*). Two specimens.

Epipsocus completus sp. nov. Plate I, fig. 5.

Yellowish, nasus rather darker; head narrow, eyes rather large; antennæ yellowish; thorax unspotted; legs pale. Wings hyaline, marked with brown; a broad band before middle, one at about middle across stigma rather obliquely to the areola postica, its outer margin distinct; areola postica mostly dark, and thence along outer margin a broad dark area, leaving a pale spot in base of second median fork; the radial fork with only a band across it and a dot at base. Stigma long; areola postica long. In hind wings the upper branch of first fork a long distance before tip, but oblique.

Length to tip of wings, 3.8 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*). Apparently related to *E. marginatus* Enderlein, but the markings more extensive, and the venation of the hind wing different.

Genus AMPHIPSOCUS McLachlan

Key to the species.

a^1. Radius and median united at one point; wings clear.................... unitus.
a^2. Radius and median not united, but connected by a cross vein; wings smoky .... connexus.

Amphipsocus connexus sp. nov. Plate I, fig. 6.

Clypeus, nasus, and vertex black, sides of face pale; antennæ black, basal joints pale; thorax almost entirely black above, pleura pale; legs pale, tibiæ blackish. Wings smoky, venation blackish, stigma red, and the red extending back over the spur. Wings not very long; stigma large, angulate, and with a long spur behind; median and radius connected by a cross vein, not united; radial fork about one-half way between the forks of the median; areola postica subtriangular and moderately high. In hind wings the upper branch of the first fork ends near tip of the wing. Eyes small, but near to the top of the vertex.

Length to tip of wings, 4 millimeters.

MINDANAO, Butuan (*Baker*).

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Amphipsocus unitus sp. nov. Plate I, fig. 7.

Pale yellowish, ocelli on a black dot; antennæ pale, legs very pale. Wings hyaline; stigma pink; venation yellowish, basal part of radius to the median vein dark. Stigma large, angulate behind and with a minute spur; radius and median united at one point; fork of radius nearer to the first than to the second fork of the median; areola postica nearly as high as long. In hind wings the upper branch of the first fork reaches to near the tip of the wing. Eyes small, not nearly as high up as the vertex.

Length to tip of wings, 4.6 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*).

Genus **TAGALOPSOCUS** novum

Related to *Cæcilius,* but distinguished by the long stigma, very similar in this respect to *Tæniostigma;* venation with very short bristles. In hind wings the first fork has its upper side nearly to tip of wing, not directed upward. Tarsi two-jointed.

Tagalopsocus luzonensis sp. nov. Plate I, figs. 9 and 10.

Black; two large pale spots on front between antennæ, separated by a narrow black line; vertex pale on each side; antennæ wholly pale; pubescence rather short. Thorax jet black, leaving only a pale median depressed spot. Legs very pale yellowish, almost white. Wings hyaline, long, almost acute at tips; stigma reddish, very long and slender; venation yellowish, some veins near the tip darker; median and radius united at one point; radial fork opposite first fork of the median, areola postica rather high, but evenly rounded.

Length to tip of wings, 6.2 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*).

Kolbea bakeri sp. nov. Plate I, fig. 8.

Pale yellowish; clypeus large, blackish; nasus dull black, with a narrow median black stripe running up on the vertex; eyes very small; antennæ blackish, the basal joints yellowish; mesonotum with three black patches, one in front and one on each side; legs yellowish, the tibiæ, especially the hind tibiæ, dark. Wings hyaline; stigma reddish; venation dark; veins with rather short bristles; stigma rounded behind; radius and median vein united at one point; areola postica very high.

Length to tip of wings, 4.1 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*).

In appearance this species is very similar to *Amphipsocus unitus,* but the latter has no distinct marks on head, and the stigma has the posterior spur.

Genus CÆCILIUS Curtis

Key to the species.

a^1. Veins with dark dots and several brown clouds .... guttulatus.

a^2. Veins without dark dots.

  b^1. Radial fork arises before first fork of the cubitus; faint dark marks at stigma and ends of veins .... inæqualis.

  b^2. Radial fork arises beyond first fork of the cubitus; wing unmarked .... castellus.

Cæcilius castellus sp. nov. Plate II, fig. 11.

Pale yellow; mid lobe of mesonotum brown; legs and antennæ very pale. Wings long and slender, faintly yellowish, more distinctly so in costal half; venation pale, but apical forks dark; stigma long and slender; radius and median united at one point, fork of radius about halfway between the forks of the median; areola postica very small and much longer than high. In hind wings upper branch of the fork vertical to the anterior margin and nearer to the other fork than to the tip of the wing.

Length to tip of wings, 2.8 millimeters.

LUZON, Laguna, Los Baños (*Baker*). Two specimens.

Cæcilius guttulatus sp. nov. Plate II, fig. 12.

Grayish; nasus faintly lineate with reddish; vertex with four reddish spots; antennæ rather dark, the short joints beyond middle dark, but with snow-white apices; thorax with several rufous spots; legs pale, tibiæ with dark tips, tarsi dark. Wings hyaline, rather short; venation as figured; venation pale, with prominent dark dots on all except anal vein; dark clouds at ends of veins; stigma short, rather suddenly truncate, mostly occupied by dark clouds, one of them continued back to radial sector, and another above areola postica; a small dark cloud above cubitus, and two others toward base of wings. Hind wings hyaline, with brown venation. Head broad; eyes small.

Length to tip of wings, 2.9 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*).

Cæcilius inæqualis sp. nov. Plate II, fig. 13.

Pale yellowish; basal joints of antennæ reddish. Wings hyaline, venation pale, but dark and with a narrow dark margin near tip, an apical brown cloud in the stigma, and a spot at end of anal vein. Wings rather slender; stigma long, slender, evenly rounded behind; radius and median united for a short distance; the radius forks a little before the first fork of the median, the forks of the latter being unusually short; areola postica long, highest toward base. In hind wing the upper branch of the first fork is a long distance from tip and vertical.

Length to tip of wings, 2.3 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*). This species is peculiar on account of the short median forks.

Dypsocus apicatus sp nov. Plate II, figs. 14 and 15.

Black; antennæ from the fourth joint outward pale yellowish; fore wings a little pale at areola postica, elsewhere black, and through the middle area the surface transversely, rugosely waved; apical part and stigma swollen and polished; head and thorax with minute scattered whitish hairs; second joint of antennæ long, heavy, and plainly curved, longer than the third.

Length to tip of wings, 4 millimeters.

PALAWAN, Puerto Princesa (*Baker*). This species is related to *D. coleoptratus* Hag., but the proportions in the venation and basal joints of the antennæ are different.

PLECOPTERA

This order includes the Pelidæ, or stone flies; the species so far received all belong to *Neoperla*, or *Ochtepetina* as it is called by some authors.

Genus **NEOPERLA** Needham

Key to the species.

a^1. Cross vein up from radial sector to the radius extending obliquely backward .... obliquus.
a^2. This cross vein straight across.
  b^1. Pale yellowish; ocelli of moderate size .... clarissa.
  b^2. Brownish yellow; ocelli very large .... recta.

Neoperla obliquus Banks.

From Mount Maquiling and Los Baños. A large yellowish brown species, the legs and setæ pale yellow, the antennæ brown.

Neoperla recta Banks.

Numerous specimens from Mount Maquiling and Los Baños. In general appearance this species is very similar to *N. obliquus*.

Neoperla clarissa Banks.

Specimens from Mount Maquiling and Los Baños. A smaller and more yellow species than the others.

ANISOPTERA

The Ephemeridæ, or mayflies, are represented in the collection by only four or five specimens. Doubtless they are fairly numerous, as many are recorded from Java and other Malasian regions; therefore I have made a generic table for all genera likely to occur in the Philippines, as far as indicated by their known distribution.

Key to the genera.

a^1. Vein 8 plainly forked, and with one (or more) longitudinal vein between the forks; mid and hind legs very short; eyes of male widely separated.
- b^1. First vein ends near middle of costal margin; between vein 9 and its fork only one longitudinal vein; rather few cross veins. **Palingenia.**
- b^2. First vein runs out to near tip; between vein 9 and its fork are several longitudinal veins; many cross veins.......... **Polymitarcys.**

a^2. Vein 8 not plainly forked; if some of its branches appear as forks, then no longitudinal veins between forks.
- c^1. Margin of wing (of adult) ciliate; only two wings; three setæ; eyes of male separated; no marginal intercalaries.
  - d^1. Costal and many discal cross veins.......... **Tricorythus.**
  - d^2. No costals and few discal cross veins.......... **Cænis.**
- c^2. Margin of wing (of adult) not ciliate behind.
  - e^1. Hind wings absent or very slender (more than twice as long as broad, and with but two longitudinal veins; some marginal intercalaries; two setæ; eyes of male turbinate, approximate.
    - f^1. Hind wings present, marginal intercalaries in pairs.......... **Baetis.**
    - f^2. Hind wings absent.
      - g^1. Marginal intercalaries in pairs.......... **Pseudocloeon.**
      - g^2. Marginal intercalaries single.......... **Cloeon.**
  - e^2. Hind wings present and broad.
    - h^1. Vein 9 much curved and ending in hind margin long before anal angle.
      - i^1. Three setæ, hind wings very small; few marginal intercalaries. **Thraulus.**
      - i^2. Two setæ.
        - j^1. A large free space at base above vein 8.......... **Rhœnanthus.**
        - j^2. No such free space.......... **Chirotonetes.**
    - h^2. Vein 9 little curved, nearly parallel to hind margin, and ends near anal angle; several longitudinal veins between 8 and 9.
      - k^1. Cross veins arranged in several series, leaving large free spaces. **Comproneuria.**
      - k^2. Cross veins all over.
        - l^1. Hind tarsi twice as long as the tibiæ.......... **Atopopus.**
        - l^2. Hind tarsi barely longer than hind tibiæ.......... **Thalerosphyrus.**

Only three specimens have been received; these belong to the genera *Thraulus* and *Thalerosphyrus;* one of them appears to be *Thalerosphyrus torridus* Walker, described very briefly from the Philippines.

MEGALOPTERA

No species of this order has yet been recorded from the Islands, but probably one or more species of *Hermes* and *Chauliodes* will eventually be found, since they are known from several islands in Malasia.

NEUROPTERA

Key to the families.

- a^1. Front legs enlarged, raptorial; ocelli present, pronotum long. **Mantispidæ.**
- a^2. Front legs not enlarged.
  - b^1. Minute species, with farinose wings having few veins. **Coniopterygidæ.**
  - b^2. Moderate to large; wings not farinose.
    - c^1. Antennæ short, enlarged at tip........ **Myrmeleonidæ.**
    - c^2. Antennæ long.
      - d^1. Antennæ capitate........ **Ascalaphidæ.**
      - d^2. Antennæ not capitate.
        - e^1. Greenish species; margin of wing without a dot between veins. **Chrysopidæ.**
        - e^2. More or less brownish; margin of wings with a dark dot or short line intercalate between ends of veins........ **Hemerobiidæ.**

HEMEROBIIDÆ

Key to the genera.

- a^1. But one radial sector.
- a^2. At least two radial sectors.
  - b^1. Practically no cross veins beyond the middle of wings, small species. **Sisyra.**
  - b^2. Many cross veins; ocelli present; both median and cubital veins forked near base........ **Spilosmylus.**
    - c^1. Fore wings at base without a recurrent vein; two series of gradates. **Micromus.**
    - c^2. Fore wings broad at base and with a recurrent vein.
      - d^1. Outer and inner gradates present........ **Hemerobius.**
      - d^2. Only one series of gradates present.
        - e^1. No outer series of gradates........ **Notiobiella.**
        - e^2. No inner series of gradates........ **Sympherobius.**

Spilosmylus modestus Gerst.

One from Mount Maquiling. Previously known from Java.

Sisyra bakeri Banks.

Several from Los Baños and Mount Maquiling. A small, shiny, brown-winged species.

Micromus pusillus Banks.

From Los Baños, Mount Maquiling, and Mount Banahao. Previously recorded from Java.

Notiobiella affinis Banks.

From Manila, Luzon, and Baguio, Benguet.

CHRYSOPIDÆ

Key to the genera.

- a^1. Third cubital cell not divided; between radial sector and median vein is a complete series of connecting veinlets forming a false vein and extending out to the gradates .... **Apochrysa.**
- a^2. Third cubital cell divided; no such false vein.
  - b^1. Third cubital cell divided longitudinally .... **Nothochrysa.**
  - b^2. Third cubital cell divided obliquely, so that the divisory veinlet ends on the upper side of the cell.
    - c^1. Costal area of fore wings very broad at base .... **Ancylopteryx.**
    - c^2. Costal area of fore wings very narrow at base .... **Chrysopa.**

Apochrysa bellula Banks.

Only the type from Los Baños. A large, densely veined species, with a dark spot at the upper end of the inner gradate series in the fore wings.

Genus **NOTHOCHRYSA** McLachlan

The two Philippine species of this genus have the antennæ black, except the basal joints.

Key to the species.

- a^1. Pronotum margined with dark; some cross veins in basal middle space of fore wings dark .... **evanescens.**
- a^2. Pronotum not margined; cross veins pale .... **æqualis.**

Nothochrysa æqualis Walker.

Two from Los Baños.

Nothochrysa evanescens McLachlan.

One from Los Baños.

Genus **CHRYSOPA** Leach

Key to the species.

- a^1. Wings with some dark clouds .... **faceta.**
- a^2. Wings without clouds.
  - b^1. Second joint of antennæ dark, a dark median spot on face below antennæ .... **azygota.**
  - b^2. Second joint of antennæ pale.
    - c^1. Venation partly dark; gradates dark .... **ilota.**
    - c^2. Venation, including gradates, pale.
      - d^1. Gradates divergent; inner series at upper end very close to the radial sector .... **tagalica.**
      - d^2. Gradates subparallel.

e^1. Inner gradates few (3 or 4), each much more than its length from the next one; divisory veinlet ends beyond the cross vein .... isolata.

e^2. Inner gradates (6 or 7) scarcely their length apart; divisory veinlet ends before the cross vein .... morota.

Chrysopa faceta Navas.

Described from Luzon; I have one specimen from Mount Maquiling.

Chrysopa isolata Banks.

Two from Mount Maquiling.

Chrysopa morota Banks.

From Mount Maquiling and Los Baños.

Chrysopa tagalica Banks.

Two from Los Baños.

Chrysopa ilota Banks.

Two from Mount Maquiling.

Chrysopa azygota Banks.

One from Mount Maquiling.

Ancylopteryx 8-punctata Fabricius.

From Los Baños. The wings have several dark dots. Widely distributed in Malasia.

Ancylopteryx doleschalli Brauer.

From Los Baños, Luzon, and Puerto Princesa, Palawan. With spots in wing much larger than in the other species. Known from Celebes and Amboina.

MANTISPIDÆ

Key to the genera and species.

a^1. Radial sector with at least ten or more branches; costal fourth of wings brown, large species .... **Euclimacia tagalensis Banks.**

a^2. Radial sector with from five to eight branches.

b^1. In hind wings the cubital vein connected to anal by a cross vein; a dark streak in tips of wings .... **Climaciella luzonica Weele.**

b^2. In hind wings the cubitus bent down to touch the anal vein; no dark streaks in tips of wing.

c^1. Femora and tibiæ with dark bands near the middle; stigma short, triangular .... **Mantispa manca Gerst.**

c^2. Femora and tibæ without median bands; stigma normally elongate.

d^1. Antennæ with a pale annulus before tip.

Mantispa annulicornis Gerst.

d^2. Antennæ without a pale annulus toward tip.
  e^1. Costa and radius pale yellow............ **Mantispa enderleini** Banks.
  e^2. Costa and radius dark or black.......... **Mantispa luzonensis** Navas.

Euclimacia tagalensis Banks.

One, the type, from Los Baños.

Climaciella luzonica Weele.

Several from Los Baños and Mount Banahao.

Mantispa manca Gerst.

Two from Mount Maquiling; widely distributed in Insulinde.

Mantispa annulicornis Gerst.

From Mount Maquiling and Mount Banahao; also known from various Malasian islands.

Mantispa luzonensis Navas.

Various specimens from Los Baños, Mount Maquiling, and Mount Banahao.

Mantispa enderleini Banks.

From Los Baños; Mount Maquiling; Butuan, Mindanao; and Puerto Princesa, Palawan.

ASCALAPHIDÆ

Key to the genera.

Three genera are known to occur in the Islands, and the distribution of *Hybris* is such that it may also be present.

a^1. Between cubitus and hind margin in hind wing not more than three rows of cells; veins beyond end of anal not plainly branches of cubitus.
  b^1. Pterostigma short, about as high as long.............................. **Suhpalasca.**
  b^2. Pterostigma plainly longer than high................................ **Suphalomitus.**
a^2. Between cubitus and hind margin in hind wing more than three rows of cells; some veins beyond end of anal apparently branches of cubitus.
  c^1. Wing tips acute; male appendages elongate................................ **Hybris.**
  c^2. Wing tips rounded; male appendages very short................. **Protacheron.**

Suhpalasca princeps Gerst.

One from Los Baños; described from Java. The tips of the wings are blackish.

Suphalomitus malayanus McLachlan

Recorded from Basilan (*Doherty coll.*). Wings hyaline, tips barely darker. Known also from Celebes and Java.

Protacheron philippinensis Weele.

Described from Florida Blanca Mountains, Luzon, and since recorded from Celebes and Java. The male with hyaline wings, in female the hind wings are dark near the outer hind margin.

MYRMELEONIDÆ

Key to the genera.

a^1. In fore wing the second and third anal veins are separate, but connected by a cross vein; a line in apex of the wing.
  b^1. Legs and spurs very long and slender; wings not excised nor sinuated on the outer margin; first tarsal joint about as long as the last. **Dendroleon.**
  b^2. Legs and spurs shorter; first tarsal joint shorter than the last; wings more or less excised on the outer margin................................ **Episalus.**
a^2. In fore wing the second and third anal veins are united for at least one point.
  c^1. One cross vein before origin of radial sector in the hind wing.
    d^1. In fore wing the anal runs parallel to the cubitus for a long distance; first tarsal joint very long... **Protoplectron.**
    d^2. Anal diverges from cubitus.
      e^1. Legs rather short and stout; spurs about equal to three or four tarsal joints.. **Distoleon.**
      e^2. Legs very slender; the tibia about as long as femur.
        f^1. Radial sector in fore wing arises much before the cubital fork; spurs as long as three or four joints........................ **Acratoleon.**
        f^2. Radial sector arises much beyond the cubital fork; spurs shorter; claws very long.. **Paraglenurus.**
  c^2. Three or more cross veins before origin of radial sector in the hind wing.
    g^1. Legs short and stout; spurs bent; body very hairy.... **Acanthaclisis.**
    g^2. Legs more slender and less hairy; spurs only slightly curved.
      h^1. Wings very broad at stigma; a series of connecting veinlets before stigma in fore wing... **Hagenomyia.**
      h^2. Wings more slender, no such series of connecting veinlets. **Myrmeleon.**

Dendroleon sanchezi Navas.

Described from Luzon, under the name *Delgadus*. I have not seen it.

Genus MYRMELEON Linnæus

The two species so far received may be distinguished as follows:

Key to the species.

a^1. Vertex all black.. **celebesensis.**
a^2. Vertex with two pale spots... **angustipennis.**

Myrmeleon angustipennis sp. nov. Plate II, fig. 16.

Practically only a form or variety of *M. tenuipennis* Rbr., but differs in that the dark stripe on the pronotum is as broad in front of the transverse groove as behind it.

Head mostly black; lower sides of face, clypeus, orbital line, and two submedian spots on the vertex pale yellowish; basal joint of antennæ also pale; spots on vertex sometimes connected. Pronotum with a broad dark median stripe, the anterior part as broad as the posterior, the anterior part with a pale median line. Legs mostly pale, hind femora with a preapical dark band. Abdomen dark, with pale pubescence. Wings hyaline, unmarked, venation pale, with minute dark dots; wings as slender as in *M. tenuipennis,* the tips acute; twelve branches to the radial sector; seven cross veins before radial sector in fore wing, four in the hind wing; in fore wing the radial sector arising just beyond the cubital fork; two cross veins between cubital fork and anal; one cross vein in hind wing; in the fore wing a few costals before the stigma forked.

Expanse, 52 millimeters.

LUZON, Laguna, Los Baños and Mount Maquiling (*Baker*). Very close to *M. tenuipennis,* which I have from northern India and Ceylon. *Myrmeleon freyeri* Navas is a synonym of *M. tenuipennis.*

Myrmeleon celebesensis McLachlan.

One from Mount Maquiling. *Myrmeleon capito* Navas from Borneo is the same species, and both are probably synonyms of *M. solers* Walker from China.

Genus **DISTOLEON** Banks

Distoleon will replace *Formicaleo* as used by most authors. *Formicaleo* was originally applied only to the type species of *Myrmeleon* and so is a synonym of it. *Formicaleon* Banks is a synonym of *Distoleon.*

Key to the species.

a^1. In fore wing the branches of cubitus bent to form a line.
  b^1. The line only one row of cells behind the cubitus .... disjunctus.
  b^2. The line three to five cells behind the cubitus .... bakeri.
a^2. In fore wing the branches, although somewhat bent, not forming a line .... cleonice.

Distoleon bakeri sp. nov. Plate II, fig. 17.

Face pale; dark spot between antennæ, reaching narrowly below and broadly above; vertex with an anterior, double curved dark band, and behind curved marks which inclose two pale submedian spots. Antennæ dark, with pale annuli. Pronotum dark, traces of a pale median line, and a curved pale mark each side in front; median lobe of mesothorax with a median line and the hind border pale. Abdomen dark, with a pale median spot near middle of several segments. Legs rather dark, paler on base or above, spots and dots on the tibiæ, tarsal joints dark at tips. Wings hyaline, stigma and spot at end of cubitus dark, and in the fore wings a dark dot at end of anal. Venation dark, subcosta and radius with pale streaks, and some other veins with pale markings. Wings of moderate length, acute at tips; in fore wing a line between branches of cubitus but situated four or five cells behind the upper cubitus; in hind wing only two rows of cells behind the cubitus; in fore wing eight cross veins before the radial sector; latter with ten branches; in fore wings seven cross veins between anal and cubital fork, only one such cross vein in the hind wing.

Expanse, 54 millimeters.

PALAWAN, Puerto Princesa (*Baker*).

Distoleon cleonice Banks.

From Los Baños.

Distoleon disjunctus Banks.

From Los Baños and Mount Maquiling.

CONIOPTERYGIDÆ

No species of this family is yet recorded from the Philippine Islands.

MECOPTERA

No species of this order has been taken in the Philippine Islands.

TRICHOPTERA

Key to the families.

a^1. Palpi with the last joint slender, flexible, or multiarticulate.
  b^1. Not more than three apical forks in the fore wings; a few bristles on the thorax among the hairs........ **Leptoceridæ**
  b^2. Four or five apical forks in fore wings; no bristles on thoracic notum. **Hydropsychidæ.**
a^2. Palpi with last joint shorter, entire, not flexible.
  c^1. Minute species; wings slender and acute; hairs mostly erect; few veins in wings........ **Hydroptilidæ.**
  c^2. Size moderate; wings normal.
    d^1. Ocelli present........ **Chimarrha.**
    d^2. Ocelli absent.
      e^1. A closed median cell behind the discal cell in the fore wings; fork 4 present........ **Calamoceratidæ.**
      e^2. No closed median cell; fork 4 absent........ **Sericostomatidæ.**

SERICOSTOMATIDÆ

Key to the genera.

*a*¹. Forks 1, 2, 3, 5 present in both wings; discal cell in hind wings open; male palpi not upcurved and heavily haired or scaled.................. **Goera.**

*a*². Forks 1, 2, 3, 5 not all present in both wings; discal cell in hind wings open.

  *b*¹. Fore wings very broad; basal joint of male antennæ without processes. **Neolepidostoma.**

  *b*². Fore wings rather slender; basal joint of male antennæ with processes above .... **Dinarthrodes.**

The above genera occur in Java, but none is yet recorded from the Philippines.

CALAMOCERATIDÆ

Key to the genera.

*a*¹. Radius in fore wing not running into the first apical sector. **Anisocentropus.**

*a*². Radius in fore wing running into the first apical sector, also in hind wing.

  *b*¹. Fore wings very long, rather narrow, and slightly falcate at tips; hind wings as broad as, or broader than, the fore wings........ **Asotocerus.**

  *b*². Fore wings broad, not falcate at tips; hind wings narrower than the fore wings.. **Ganonema.**

Anisocentropus magnificus Ulmer.

One from Los Baños. A black-winged species with a blue sheen to the fore wing and a hyaline oblique bar across middle.

Asotocerus umbrosus sp. nov. Plate II, fig. 18.

Yellowish brown; antennæ yellowish, plainly ringed with black at tips of the joints; legs yellowish. Wings very dark brown, costal area and along anal veins almost black; hind wings fully as dark. Vertex with a prominent, median, rounded depression, a little longer than broad, and rather broader behind than in front; posterior warts large, nearly reaching the eyes, and not their long diameter apart. Fore wing with venation as figured, strongly falcate at tip; in hind wings forks 2 and 3 are subequal, fork 1 as far back as origin of the pedicel of fork 3.

Expanse, 36 millimeters.

PALAWAN, Puerto Princesa (*Baker*).

LEPTOCERIDÆ

Key to the genera.

*a*¹. Discoidal cell in hind wings closed; fore wings extremely long. **Notanatolica.**

*a*². Discoidal cell in hind wings open.

  *b*¹. Fork 2 in fore wing present... **Triaenodes.**

b^2. Fork 2 in fore wing absent.
  c^1. In hind wings (which are very broad) the costal venation indistinct. **Leptocella.**
  c^2. In hind wings the costal venation as distinct as elsewhere.
    d^1. Two spurs on front tibia; in female the median vein in fore wing twice branched beyond the anastomosis .... **Leptocerus.**
    d^2. But one or no spurs to front tibia; in female (as in male) the median but one-branched beyond anastomosis.
      e^1. Upper median of fore wing plainly forked at or near anastomosis.
        f^1. Fore wings very broad; hind wings also rather broad; fore wings sparsely clothed with hair .... **Tagalopsyche.**
        f^2. Fore wings as well as hind wings very slender; fore wings densely clothed with hair .... **Setodes.**
      e^2. Upper median simple, the lower median forked at or near the anastomosis.
        g^1. Subcosta and radius united above the discal cell.... **Œcetinella.**
        g^1. Subcosta and radius not united .... **Œcetina.**

Leptocella bakeri Banks.

One, the type, from Los Baños.

Notanatolica magna Walk.

From Mount Maquiling.

Notanatolica opposita Walk.

Several from Mount Maquiling and Los Baños; both of these species are widely spread in this region.

Œcetinella confluens Ulmer.

Two from Los Baños. Described from Java.

Œcetina sp.

A broken specimen from Mount Maquiling.

Setodes apicipennis Banks.

One from Los Baños.

Tagalopsyche sisyroides Banks.

Two from Mount Maquiling and Los Baños.

HYDROPSYCHIDÆ

This family is usually divided into four families; however, three of them are very closely interwoven in structure, so it is better to use but two groups which I believe are not more than subfamilies.

Key to the subfamilies.

a^1. Antennæ much longer than fore wings; palpi often lacking; hind wings much broader than the fore wings .... **Macronematinæ.**
a^2. Antennæ not as long as fore wings; palpi present; hind wings but little if any broader than fore wings .... **Hydropsychinæ.**

MACRONEMATINÆ

Key to the genera.

a^1. Palpi lacking.
  b^1. No median cell; discoidal cell very broad; venation peculiar. **Œstropsyche.**

  b^2. Median cell present.
    c^1. Discal all present, normal .... **Polymorphanisus.**
    c^2. Discal all absent or abnormal .... **Œthaloptera.**
a^2. Palpi present.
  d^1. Discal cell of fore wings closed .... **Macronema.**
  d^2. Discal cell of fore wings open or lacking; some costal cross veins. **Amphipsyche.**

Œstropsyche vitrina Br.

Recorded from the Philippines; I have not received it.

Polymorphanisus semperi Br.

Described from the Philippine Islands; I have three from Mount Maquiling. A large, green caddice fly, the male with hyaline streaks in apex of wing.

Macronema bella sp. nov. Plate II, fig. 19.

Head, prothorax, two basal joints of the antennæ, all coxæ and femora, and the hind tibia nearly golden yellow; rest of the antennæ, front legs, and thorax black; rest of body and middle and hind tibia brown. Fore wings rich dark brown, with several clear, silvery white marks as in the figure; a subapical streak, two costal spots, tending to form a V, one behind, with a basal extension, a small costal mark toward base, another small median spot nearer base, and a double, oblique mark behind; the latter may be broken into two spots. Hind wings not quite as dark as the fore wings, with two white costal spots toward tip. Fore wings not very acute at tip and rather narrow; fork 1 with pedicel one half as long as discal cell, the latter twice as long as broad, and rather broader than the median, but latter one third longer. Venation black, except on the white spaces. Vertex with large, nearly circular anterior warts, not their diameter apart, posterior warts not one fourth as large, subtriangular; mesonotum polished. Male inferior appendages slender, apical part about as long as basal; barely clavate.

Expanse, 36 millimeters.

LUZON, Tayabas, Malinao (*Baker*).

HYDROPSYCHINÆ

Key to the genera.

a^1. Fork 4 of fore wings as long as fork 5, or fork 5 absent.
  b^1. Fork 5 absent; spurs 3, 4, 4 .... **Pseudoneureclipsis.**

b^2. Fork 5 present.
c^1. Ocelli present; a cross vein above end of discal cell.
d^1. Spurs 2, 4, 4; small species .... **Echnopsyche.**
d^2. Spurs 3, 4, 4; large species .... **Stenopsyche.**
c^2. Ocelli absent; no such cross vein.
e^1. Fork 1 absent in hind wings.
f^1. Spurs 3, 4, 4; fork absent in the wings .... **Ecnomus.**
f^2. Spurs 2, 4, 4; fork 3 present in hind wings .... **Hydropsychodes.**
e^2. Fork 1 present in both wings.
g^1. Antennæ crenulate beneath; abdomen with filament each side. **Diplectrona.**
g^2. Antennæ not crenulate; no filament to the abdomen.
h^1. Female with mid tibiæ broadened; male with outer claw malformed or absent .... **Hydropsyche.**
h^2. Female with tibiæ normal; and male with claws normal. **Hydromanicus.**
a^2. Fork 4 of fore wings shorter than fork 5, or fork 4 absent.
i^1. Ocelli present; fork 4 absent in fore wings; spurs 2, 4, 4 .... **Chimarrha.**
i^2. Ocelli absent; fork 4 present.
j^1. Spurs 3, 4, 4.
k^1. Discal cell in hind wings closed; fork 1 in hind wings present; pronotum rather long .... **Dipseudopsis.**
k^2. Discal cell in hind wings open; pronotum small.
l^1. Fork 1 in hind wings present .... **Polycentropus.**
l^2. Fork 1 in hind wings absent .... **Polyplectropus.**
j^2. Spurs 2, 4, 4; fork 1 absent in both wings; hind wings narrow.
m^1. Third joint of palpi longer than second .... **Tinodes.**
m^2. Third joint of palpi shorter than second .... **Psychomyia.**

Genus DIPSEUDOPSIS Walker

a^1. Wings rather clear, and all veins distinctly margined with brown. **nervosa.**
a^2. Veins not distinctly margined with brown.
b^1. Male with a few short pale spots beyond anastomosis, none before; female pale, unmarked .... **bakeri.**
b^2. Male with elongate silvery spot beyond anastomosis, and one or more before .... **luctuosa.**

Dipseudopsis nervosa Br.

Described from the Philippine Islands; one from Los Baños.

Dipseudopsis luctuosa Banks.

From Los Baños and Mount Maquiling.

Dipseudopsis bakeri sp. nov. Plate II, figs. 20 and 21.

Brown; antennæ, palpi (except the last joint), legs, and venter yellowish. Wings brownish yellow, veins pale yellowish, the membrane with minute golden hairs; a hyaline white spot on origin of median fork and on cross vein obliquely back of it. Beyond anastomosis in the base of each cell including fork 1 to fork 4 is a pale, rather silvery spot, the middle pair elongate, but all small; in one case one spot stretches along the lower border of fork 2; a pale elongate spot near end of anal vein, and one in the cell above it. Hind wings brownish, with the median fork and cross vein hyaline white. Venation very similar to that of *D. nebulosus,* the discal and median cells rather shorter than in that species, the wing beyond the anastomosis also a little shorter. In the female the color is more yellowish throughout, and in the fore wings there is no spot beyond the anastomosis.

Expanse, 27 millimeters.

LUZON, Laguna, Mount Maquiling and Los Baños (*Baker*).

At first I took this to be but a form of *D. nebulosus,* but with additional material, including males, it is seen to be very distinct; the form of the modified spur is very different from that of *D. nebulosus.*

Diplectrona cinctipennis Banks.

From Los Baños and Mount Maquiling; described as a *Hydromanicus.*

Hydromanicus fasciatus Ulmer.

One from Los Baños; also known from Java.

Hydropsychodes costalis Banks.

Two from Los Baños.

Echnopsyche reticulata Banks.

One, the type, from Los Baños.

Chimarrha luzonica Banks.

One from Los Baños.

Polyplectropus sp.

One specimen, black-winged, dotted, with golden hairs.

Nyctiophylax tagalensis sp. nov. Plate II, fig. 22.

Brown; palpi yellowish brown; antennæ pale yellowish; gray hair between the antennæ, brown on the vertex; legs pale yellowish, the middle tarsi with dark marks. Abdomen dark in the middle, pale at base and tip. Wings yellowish gray, marked with brown, many short, fine, golden hairs; patches of brown at stigma, along costal, along anal margins, and over the cubital fork, and smaller ones elsewhere, especially along the outer margin and in region of the anastomosis; hind wings gray, darker at tips.

Expanse, 8 millimeters.

LUZON, Laguna, Mount Maquiling (*Baker*).

ILLUSTRATIONS

PLATE I

FIG. 1. *Calopsocus rizali* sp. nov., fore wing.
2. *Calopsocus rizali* sp. nov., head.
3. *Myopsocus bakeri* sp. nov., fore wing.
4. *Epipsocus inornatus* sp. nov., fore wing.
5. *Epipsocus completus* sp. nov., wings.
6. *Amphipsocus connexus* sp. nov., fore wing.
7. *Amphipsocus unitus* sp. nov., fore wing.
8. *Kolbea bakeri* sp. nov., fore wing.
9. *Tagalopsocus luzonensis* g. et sp. nov., fore wing.
10. *Tagalopsocus luzonensis* g. et sp. nov., hind wing.

PLATE II

FIG. 11. *Cæcilius castellus* sp. nov., wings.
12. *Cæcilius guttulatus* sp. nov., wings.
13. *Cæcilius inæqualis,* sp. nov., fore wings.
14. *Dypsocus apicatus* sp. nov., fore wing.
15. *Dypsocus apicatus* sp. nov., basal part of antenna.
16. *Myrmeleon angustipennis* sp. nov., pronotum.
17. *Distoleon bakeri* sp. nov., head and pronotum.
18. *Asotocerus umbrosus* sp. nov., fore wing.
19. *Macronema bella* sp. nov., wings.
20. *Dipseudopsis bakeri* sp. nov., genitalia.
21. *Dipseudopsis bakeri* sp. nov., spur.
22. *Nyctiophylax tagalensis* sp. nov., male genitalia.

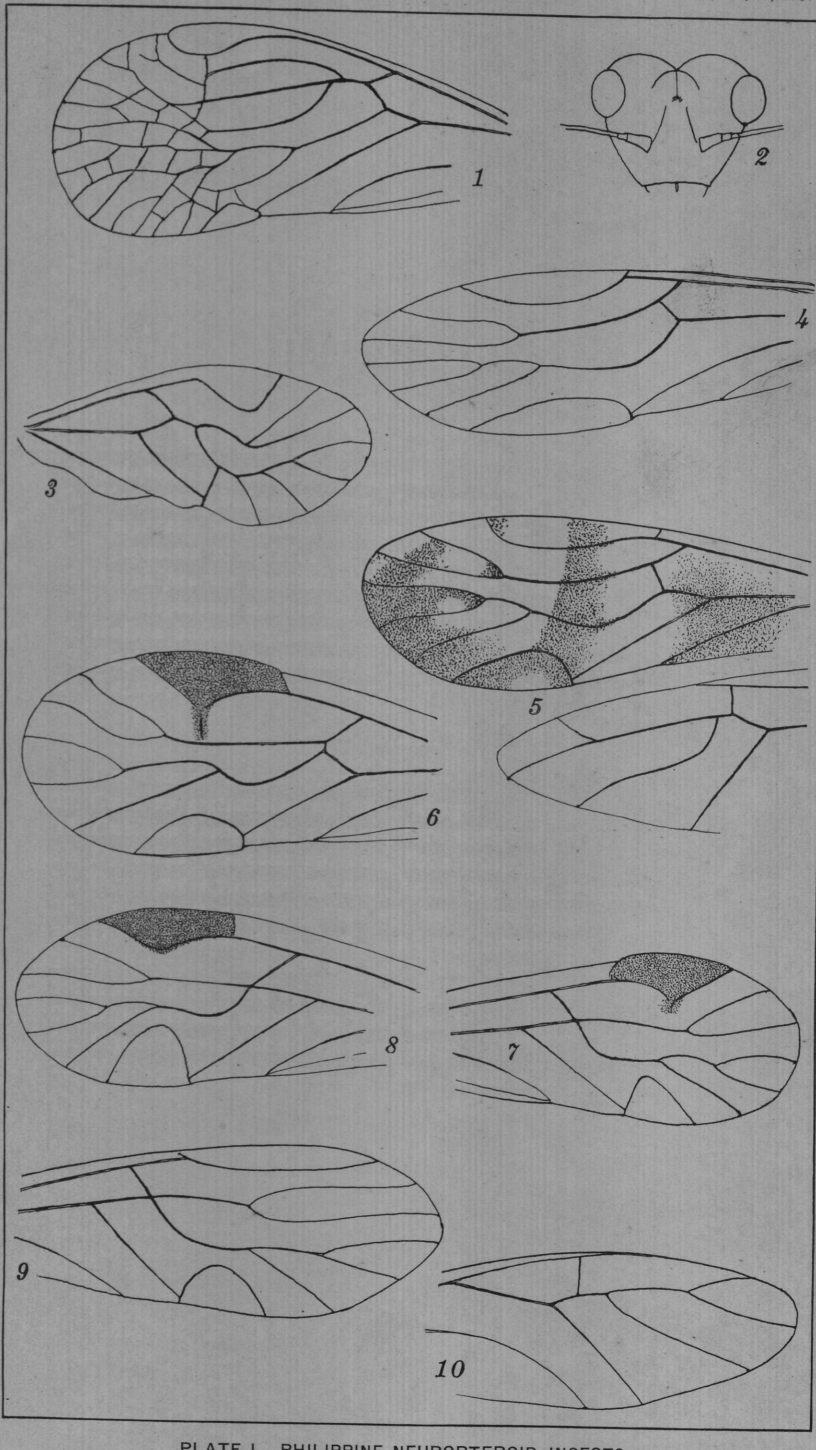

PLATE I. PHILIPPINE NEUROPTEROID INSECTS.

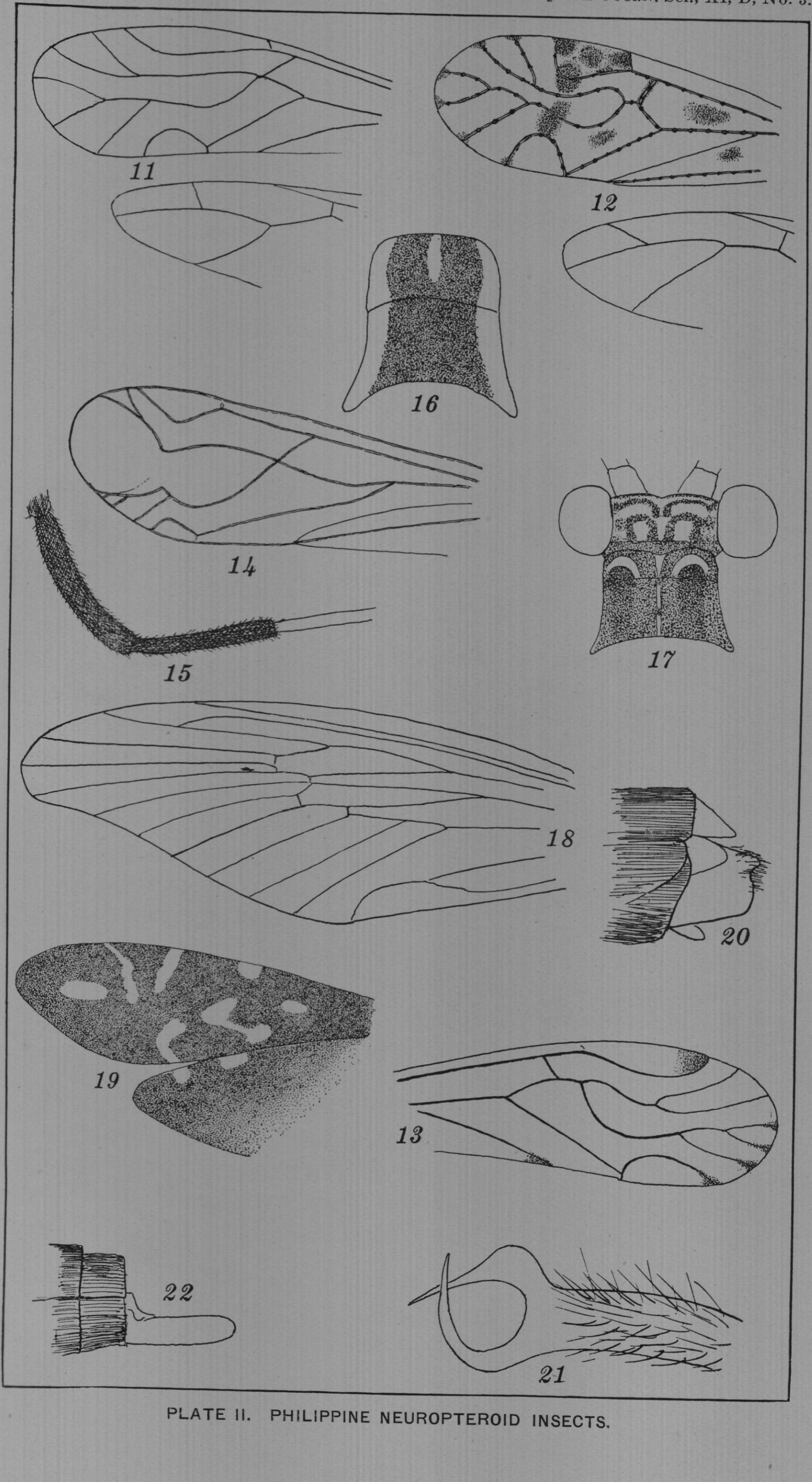

PLATE II. PHILIPPINE NEUROPTEROID INSECTS.

ELATERIDÆ DES ILES PHILIPPINES, II[1]

Par ED. FLEUTIAUX

(*Nogent-sur-Marne, France*)

Les Elaterides décrits en suite sont partie d'une collection que j'ai reçu de M. C. F. Baker, professeur d'agronomie au Collège d'Agriculture de Los Baños, îles Philippines.

Lacon dorcinus Candèze.

Comp. Rend. Soc. Ent. Belg. (1875), 119.

MINDANAO, Dapitan.

Lacon cervinus Erichson.

Nov. Act. Ac. Leop. Carol. (1834), 16; Suppl. I, 230; CANDÈZE, Révis. Mon. Elat. (1874), 48, 78.

Espèce très voisine de *L. binodulus* Motschulsky du Japon. LUZON, Laguna, Mont Maquiling.

Lacon subcervinus sp. nov.

Allongé, peu convexe; brun noirâtre, varié de rouge; pubescence grise formant des taches plus denses sur les élytres. Tête déprimée au milieu, fortement ponctuée. Pronotum plus long que large, arqué sur les côtés, fortement ponctué, surtout en avant, marqué de deux légers tubercules au milieu; angles antérieurs saillants, arrondis; angles postérieurs divergents et tronqués, longuement carénés parallèlement et près du bord latéral. Ecusson oblong. Elytres subparallèles, graduellement rétrécis dans le quart postérieur, assez fortement ponctués-striés. Dessous brun noirâtre, pubescence courte, régulière, ne cachant pas le fond; ponctuation forte en avant, plus fine en arrière. Pattes ferrugineuses.

Longueur, 12 millimètres.

LUZON, Bataan, Mont Trimay.

Voisin de *L. cervinus* Erichson. De forme moins convexe, plus allongée; pronotum plus long, moins fortement ponctué; interstries des élytres plus convexes; pubescence du dessous plus légère; hanches postérieures plus anguleuses.

Lacon bakeri sp. nov.

Allongé, subparallèle; brun noirâtre varié de rouge; pubescence jaunâtre, assez dense sur le pronotum, courte et peu serrée sur les élytres. Tête fortement ponctuée, impression née en avant. Antennes courtes, dentées, ferrugineuses. Pronotum un peu plus long que large, rétréci en avant, largement déprimé à la base, fortement ponctué; côtés sinueux, angles antérieurs assez saillants, arrondis; postérieurs divergents, largement tronqués, longuement carénés près du bord latéral. Ecusson subarrondi. Elytres parallèles, rétrécis et arrondis au sommet, assez fortement ponctués-striés, surtout latéralement; interstries peu convexes, tout-à-fait plans dans la région suturale. Dessous brun obscur; ponctuation forte dans la premiére moitié, beaucoup moins grosse en arrière; pubescence courte. Pattes ferrugineuses.

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[1] Voir le *Phil. Journ. Sci., Sec. D* (1914), 9, 441–449.

Longueur, 10 millimètres.

MINDANAO, Butuan.

Voisin de *L. piger* Candèze. Plus étroit, moins convexe, brunâtre; pronotum plus rétréci en avant, largement et nettement déprimé à la base; ponctuation moins grosse; élytres moins fortement striés; sillons tarsaux nuls, les antérieurs indiqués par une simple dépression peu profonde.

Lacon spurcus Candèze.

Elat. Nouv. (1864), 1, 11; Révis. Mon. Elat. (1874), 49, 82.

LUZON, Tayabas, Malinao.

Lacon trifasciatus Candèze.

Elat. Nouv. (1864), 1, 10; Mém. Soc. Roy. Sc. Liége (1873), II, 5, 1; Revis. Mon. Elat. (1874), 49; Ann. Soc. Ent. Belg. (1892), 485; Ann. Mus. Civ. Genova (1894), 486.

LUZON, Laguna, Mont Maquiling. MINDANAO, Butuan.

Cette espèce habite toute la région indo-malaise et jusqu'au Japon.

Meristhus nigritulus Candèze.

Elat. Nouv. (1893), 5, 10; FLEUTIAUX, Ann. Soc. Ent. Belg. (1895), 167; Phil. Journ. Sci., Sec. D (1914), 9, 441.

LUZON, Laguna, Mont Maquiling.

Alaus nebulosus Candèze.

Mon. Elat. (1857), 1, 215, 232; Révis. Mon. Elat. (1874), 121, 137.

LUZON, Tayabas, Mont Banahao.

Campsosternus rutilans Chevrolat.

Rev. Zool. (1841), 222; GERMAR, Zeitschr. f. Ent. (1843), 4, 106; CANDÈZE, Mon. Elat. (1857), 1, 342, 346; Révis. Mon. Elat. (1874), 190; Compt. Rend. Soc. Ent. Belg. (1875), 121.

sumptuosus HOPE, Trans. Ent. Soc. London (1843), 3, 288; GERMAR, Zeitschr. f. Ent. (1843), 3, 101.
rutilans var. *a* CANDÈZE, Mon. Elat. (1857), 346.

LUZON, Tayabas, Mont Banahao.

Oxynopterus mucronatus Olivier.

Journ. Hist. Nat. (1792), 1, 262, t. 14, f. 1; ESCHSCHOLTZ, Thon Arch. (1829), II, 1, 34; LATREILLE, Ann. Soc. Ent. France (1834), 148; HOPE, Proc. Zool. Soc. London (1842), 77; GERMAR, Zeitschr. f. Ent. (1843), 4, 49; CANDÈZE, Mon. Elat. (1857), 1, 358, t. 7, f 3, ♂; Révis. Mon. Elat. (1874), 205.
audouini HOPE, Proc. Zool. Soc. London (1842), 77; CANDÈZE, Mon. Elat. (1857), 1, 206.
cumingi HOPE, Proc. Zool. Soc. London (1842), 77; WESTWOOD, Cabin. Orient. Ent. (1848), 71, t. 35, f. 5.
flabellicornis CASTELNAU, Hist. Nat. Ins. Col. (1840), 1, 230.
javanus HOPE, Proc. Zool. Soc. London (1842), 78.

LUZON, Tayabas, Mont Banahao.
Habite tout l'Archipel Malais.

Monocrepidius philippinensis sp. nov.

Allongé, peu convexe; jaune brillant, pubescence plus pâle. Tête à peine distinctement pointillée, bord antérieur arrondi, peu saillant. Antennes jaunes pâle. Pronotum aussi large que long, peu convexe, brillant, arrondi sur les côtés et rétréci en avant, orné d'une tache obscure sur la ligne médiane à la base; ponctuation très fine, bien nette et écartée; angles postérieurs à peine divergents, assez longs, carénés latéralement. Ecusson noir, oblong, atténué en arrière. Elytres graduellement rétrécis en arrière, rugueux, profondément ponctués-striés, ornés en arrière d'une tache obscure assez longue, entre la suture et le bord externe. Dessous du propectus jaune, reste du corps rougeâtre. Pattes jaune pâle.

Longueur, 5 millimètres.

LUZON, Tayabas, Mont Banahao.

Espèce remarquable par son aspect brillant surtout sur le pronotum et par la forme courte de ce dernier. Quatrième article des tarses simplement dilaté et échancré en dessus pour recevoir le suivant.

Aeolus beccarii Candèze.

Ann. Mus. Civ. Gen. (1878), 117; FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 441.

LEYTE, Tacloban.

Megapenthes angulosus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 122.

LUZON, Laguna, Mont Maquiling. MINDANAO, Dapitan.

Megapenthes inconditus Candèze.

Mon. Elat. (1859), 2, 504; Compt. Rend. Soc. Ent. Belg. (1875), 122; Ann. Mus. Civ. Genova (1878), 122; FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 442.

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao et Malinao. PALAWAN, Puerto Princesa.

Espèce très variable de taille (5 à 14 millimètres) et de couleur (du jaune au brun). Mon variété de petite taille est moins fortement ponctuée sur le pronotum et rugueuse sur les élytres.

Megapenthes luzonicus Fleutiaux.

Phil. Journ. Sci., Sec. D (1914), 9, 442.

LUZON, Tayabas, Mont Banahao.

Megapenthes junceus Candèze.

Elat. Nouv. (1864), 1, 30; Ann. Mus. Civ. Genova (1878), 122.
variété CANDÈZE, Compt. Rend. Soc. Ent. Belg. (1875), 122.

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao. MINDANAO, Butuan.

Megapenthes inflatus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 122.

LUZON, Tayabas, Mont Banahao.

Megapenthes fulvus Fleutiaux.

Phil. Journ. Sci., Sec. D (1914), 9, 443.

LUZON, Tayabas, Mont Banahao.

Megapenthes maceratus Candèze.

Elat. Nouv. (1896), 6, 42.

Espèce décrite de Balabac.

Melanoxanthus hemionus Candèze.

Elat. Nouv. (1893), 5, 38.
zebra CANDÈZE, Mon. Elat. (1859), 2, 516 (pars); Compt. Rend. Soc. Ent. Belg. (1875), 124.

LUZON, Laguna, Paete.

Melanoxanthus approximatus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 123.

LUZON, Laguna, Mont Maquiling.

Melanoxanthus sextus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 124.

LUZON, Tayabas, Malinao.

Melanoxanthus bakeri Fleutiaux.

Phil. Journ. Sci., Sec. D (1914), 9, 443.

LUZON, Laguna, Mont Maquiling (localité omise, l. c.).

Melanoxanthus militaris sp. nov.

Ovale, assez convexe; noir brillant avec deux taches rouges sur les élytres, près de la base, pubescence de la couleur du fond. Tête grande, convexe, densément ponctuée, bord antérieur arrondi et saillant. Antennes assez épaisses, noires, jaunes à la base, dépassant la base du pronotum. Pronotum plus long que large, arrondi sur les côtés, rétréci en avant, moins densément ponctué que la tête: angles postérieurs bicarénés. Ecusson rugueux. Elytres graduellement rétrécis en arrière, distinctement ponctués-striés à la base, à peine visiblement vers l'extrémité. Dessous noir. Cuisses noires, tibias et tarses jaunes.

Longueur, 4.5 millimètres.

LUZON, Tayabas, Mont Banahao.

Diffère du *M. dorsatus* Candèze par sa forme elliptique, son aspect brillant, le bord antérieur de la tête tranchant, le pronotum moins long et graduellement rétréci en avant.

Melanoxanthus nitidicollis sp. nov.

Allongé, fusiforme; d'un noir brillant, angles postérieurs du pronotum flaves, une bande jaune sur le milieu de chaque élytre. Tête arrondie en avant, rebord saillant, ponctuation nulle. Antennes noirâtres, plus clairs à la base et à l'extrémité, dépassant la base du pronotum. Pronotum plus long que large, notablement rétréci en avant, finement pointillé, plus distinctement en arrière, sillonné au milieu à la base; angles postérieurs dilatés, divergents, carénés. Elytres atténués en arrière, ornés d'une bande jaune dans toute leur longueur, fortement ponctués-striés, interstries convexes. Dessous noir. Pattes jaune clair.

Longueur, 3.5 millimètres.

LUZON, Tayabas, Mont Banahao.

Près de *M. cuneolus* Schwarz; pronotum très rétréci en avant, angles postérieurs dilatés et divergents; élytres ornés d'une bande jaune dans toute leur longueur.

Melanoxanthus philippinensis sp. nov.

Oblong, convexe, atténué en arrière. Tête noire, convexe, densément ponctuée. Antennes noirâtres, rouges à la base. Pronotum plus long que large, convexe, déprimé et sillonné au milieu à la base, entièrement jaune; ponctuation regulière et serrée, moins forte que sur la tête; angles postérieurs aigus et carénés. Elytres noirs, ornés chacun d'une grande tache jaune à la base et d'une autre plus petite avant l'extrémité, fortement ponctués-striés, échancrés au sommet; interstries rugueux. Propectus jaune. Dessous du corps noir. Pattes jaunes.

Longueur, 4 millimètres.

LUZON, Tayabas, Mont Banahao. MINDANAO, Butuan.

Voisin de *M. quadrinotatus* Candèze, plus petit; pronotum entièrement jaune, taches jaunes de la base des élytres plus grandes, les postérieurs plus en arrière.

Melanoxanthus cinctus sp. nov.

Oblong, convexe; noir, avec la plus grande partie du pronotum au milieu, ses angles antérieurs, la partie dorsale des élytres et le propectus rouges. Tête noire, convexe, criblée de points ombiliqués. Antennes noires. Pronotum plus long que large, arrondi et atténué en avant, convexe, brusquement déprimé à la base, sillonné au milieu en arrière, criblé de points assez gros et serrés, rouge, marqué d'une bande noire sur le côté, ne touchant pas le bord en avant; angles postérieurs aigus et carénés. Ecusson noir ou brunâtre, triangulaire, rugueux. Elytres convexes, atténués en arrière, fortement ponctués-striés, rugueux dans les intervalles, rouges ou brunâtres, avec le pourtour noir. Dessous fortement ponctué. Propectus rouge, métasternum brunâtre, abdomen noir. Pattes brunes, plus ou moins rougeâtres.

Longueur, 4.5 à 5.5 millimètres.

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao.

Voisin de *M. bicolor* Candèze; couleur rouge moins vive, tête noire, pronotum bordé latéralement d'une bande noire, élytres rouges sur la plus grande partie du milieu.

Melanoxanthus crucifer Fleutiaux.

Phil. Journ. Sci., Sec. D (1914), **9**, 445.

MINDANAO, Butuan; Lanao, Iligan. PALAWAN, Puerto Princesa.

Melanoxanthus bitriplex Candèze.

Elat. Nouv. (1896), **6**, 43.

LUZON, Laguna, Mont Maquiling; Tayabas, Malinao. MINDANAO, Butuan. Egalement de Bornéo, Sumatra, Célèbes, îles Sangé.

Melanoxanthus luzonicus Fleutiaux.

Phil. Journn. Sci., Sec. D (1914), 9, 444.

LUZON, Laguna, Mont Maquiling (et non Los Baños, l. c.).

Melanoxanthus affinis Fleutiaux.

Phil. Journ. Sci., Sec. D (1914), 9, 444.

LUZON, Tayabas, Mont Banahao. MINDANAO, Butuan.

Melanoxanthus ater Fleutiaux.

Phil. Journ. Sci., Sec. D (1914), 9, 445.

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao.
Cette espèce atteinte 5 millimètres.

Melanoxanthus vicinus sp. nov.

Allongé, peu convexe, pubescence fauve. Tête brune, plus claire en avant, convexe et ponctuée, bord antérieur arrondi et saillant. Antennes brunes, jaunâtres à la base et à l'extrémité. Pronotum d'un brun clair, rétréci en avant, assez fortement ponctué, sillonné au milieu à la base; angles postérieur jaunes, aigus et carénés. Elytres noirs ornés chacun d'une tache jaune oblique partant de l'épaule et dirigée en arrière vers la suture et d'une autre plus petite, arrondie, au tiers postérieur, ponctués-striés. Dessous noirâtre. Pattes jaunes.

Longueur, 3 millimètres.

LUZON, Laguna, Mont Maquiling.

Espèce très voisine de *M. minutus* Candèze, la tache jaune de la base des élytres est plus longue et oblique, alors que dans l'espèce de Candèze elle affecte la forme arrondie.

Melanoxanthus infuscatus sp. nov.

Melanoxanthus infimus FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 445 (nec Candèze).

Allongé, peu convexe; d'un brun noirâtre mat, avec les angles postérieurs du pronotum et la base des élytres flaves. Tête convexe, ponctuée, brune sur le dessus, jaunâtre en avant. Antennes noirâtres, jaunes à la base. Pronotum plus long que large, peu rétréci en avant, couvert du points serrés ombiliqués; angles postérieurs aigus et carénés. Elytres noirâtres avec la base jaune graduellement obscurcis en arrière, ponctués-striés. Dessous noirâtre. Pattes jaunes.

Longueur, 3 millimètres.

LUZON, Laguna, Los Baños.

Voisin de *M. minutus* Candèze, mais d'aspect mat; pronotum de forme plus allongée à ponctuation plus grosse et ombiliquée; élytres sans taches distinctes, graduellement enfumés en arrière.

Melanoxanthus butuanus sp. nov.

Oblong, peu convexe, d'une jaune plus ou moins obscur, pubescence jaune clair. Tête fortement ponctuée, arrondie en avant, rebord saillant. Antennes jaune clair. Pronotum plus long que large, peu rétréci en avant, densément ponctué, moins fortement en avant, sillonné au milieu à la base; angles postérieurs aigus et carénés. Ecusson rugueux. Elytres graduellement rétrécis en arrière, ponctués-striés, interstries rugueux à la base. Dessous de la même couleur. Pattes flaves.

Longueur, 4 à 4.5 millimètres.

MINDANAO, Butuan.

Espèce voisine de *M. frictus* Candèze, front non caréné, pronotum légèrement arrondi sur les côtés et un peu plus étroit en avant.

Melanoxanthus bicinctus sp. nov.

Oblong; noir opaque, avec la base du pronotum et une large bande sur le milieu de chaque élytre jaunes. Tête arrondie en avant, assez fortement ponctuée. Antennes noirâtres, jaunes à la base. Pronotum à peine plus long que large, faiblement rétréci en avant, ponctué; extrème base et angles postérieurs jaunes. Elytres noirs sur la suture, sur les côtés et au sommet, jaunes longitudinalement au milieu, fortement ponctués-striés. Dessous noirâtre. Pattes jaunes.

Longueur, 3.5 millimètres.

NEGROS, les montagnes Cuernos.

Voisin de *M. taeniatus* Candèze, forme générale plus allongée et moins convexe.

Drasterius sulcatulus Candèze.

Mon. Elat. (1859), 2, 423, 427; FLEUTIAUX, Ann. Soc. Ent. Belg. (1895), 169; Phil. Journ. Sci., Sec. D (1914), 9, 442.

LUZON, Laguna, Mont Maquiling.

Elater conspurcatus Candèze.

Elat. Nouv. (1889), 4, 34.

LUZON, Laguna, Mont Maquiling.

Anchastus unicolor Candèze.

Elat. Nouv. (1881), 3, 61.

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao.

Anchastus sericeus Candèze.

Elat. Nouv. (1864), 1, 27.

MINDANAO, Butuan; Misamis, Dapitan.

Espèce décrite de Bornéo.

Anchastus fulvus sp. nov.

Oblong, déprimé; entièrement d'un jaune clair, pubescence jaune. Tête ponctuée. Pronotum aussi long que large, peu rétréci en avant, ponctuation fine et espacée; angles postérieurs bicaréné, la première carène longue, parallèle au bord externe, la deuxième très courte. Elytres ponctués-striés. Dessous de la même couleur. Pattes d'un jaune plus clair.

Longueur, 4 millimètres.

MINDANAO, Lanao, Iligan.

Ressemble à *A. sericeus* Candèze; de taille plus petite, de couleur plus claire, ponctuation plus fine; pronotum plus arrondi latéralemente, deuxième carène des angles postérieurs à peine visible.

Anchastus vittatus Fleutiaux var. **bakeri** var. nov.

Anchastus vittatus FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 445.

Pronotum latéralement bordé de jaune.

LUZON, Laguna, Mont Maquiling.

Anchastus rufangulus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 121.

LUZON, Laguna, Mont Maquiling. MINDANAO, Butuan; Lanao, Iligan.

Anchastus suturalis sp. nov.

Allongé, étroit; noir; pubescence jaune, noire sur les côtés des élytres et formant à partir de l'épaule une bande latérale s'élargissant en arrière. Tête finement ponctuée, rebordée en avant. Antennes noirâtres avec les deux premiers articles jaunes. Pronotum plus long que large, subparallèle, peu rétréci en avant, peu convexe, criblé de gros points serrés peu profonds; angles postérieurs ferrugineux. Elytres faiblement rétrécis en arrière, rugueux, fortement ponctués-striés, ornés d'une tache rouge en arrière sur la suture. Dessous noir varié de brun rougeâtre. Pattes jaunes.

Longueur, 5 millimètres.

MINDANAO, Butuan.

Espèce de forme allongée voisine de *A. rufangulus* Candèze.

Remarquable par la pubescence bicolor des élytres et la tache rouge postérieure sur la suture.

Hemirrhaphes candezei sp. nov.

Oblong, convexe; noir assez brillant; pubescence jaune claire; extrême base du pronotum, angles postérieurs et base des élytres plus au moins rougeâtres. Tête large, peu convexe, bordée en avant, assez fortement ponctuée. Antennes jaunâtres, plus clairs à la base. Pronotum plus long que large, parallèle, à peine rétréci en avant; ponctuation assez forte, pas très serrée; carène des angles postérieurs longue, très oblique et sinueuse. Ecusson grand, rétréci en arrière, convexe, rugueux. Elytres arrondis au sommet, faiblement rugueux à la base, fortement punctués-striés. Dessous de la même couleur, ponctuation forte et espacée. Pattes jaune clair.

Longueur, 2.5 à 3 millimètres.

LUZON, Laguna, Mont Maquiling.

Voison de *Arrhaphes*[2] *opacus* Candèze, angles postérieurs du pronotum, antennes et pattes jaunes; moins rugueux. J'en possède un exemplaire de Pérak et un de Banguey, Bornéo.

Hemirrhaphes cruciatus sp. nov.

Allongé, convexe, jaune. Tête plane, fortement ponctuée, noirâtre en avant. Antennes jaune clair. Pronotum plus long que large, densément ponctué, avec deux bandes obscures obliques, dans le sens de la longueur; carène des angles postérieurs transversale et sinueuse. Ecusson convexe et rugueux. Elytres arrondis au sommet, rugueux, fortement ponctués-striés, noirâtres avec quatre grandes taches jaunes occupant presque toute la surface et figurant une croix. Dessous jaunâtre, fortement et espacément ponctué. Pattes jaune clair.

Longueur, 3.5 millimètres.

LUZON, Laguna, Mont Maquiling.

Espèce voisine de *H. nigriceps* Candèze; tête noirâtre en avant; pronotum avec deux bandes longitudinales noirâtres, dessus des élytres formant une croix noire.

Cardiophorus unicolor Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 124.

LUZON, Laguna, Mont Maquiling.

Je possédais déjà de Mindanao, de Luzon et de Bohol un certain nombre d'exemplaires parmi lesquels se trouvent une variété à stries des élytres plus profondément ponctuée que je designerai sous le nom de *striatus*.

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[2] Le nom de *Arrhaphes* doit disparaître, étant déjà employé [*Arrhaphe* Schaeffer (1850), Hémiptère] [*Arrhaphus* Kraatz (1860), Coléoptère].

Cardiophorus palawanus sp. nov.

Oblong, convexe, brun rougeâtre clair, pubescence jaune. Tête rugueusement ponctuée, arrondie et rebordée en avant. Antennes jaunes. Pronotum aussi long que large, convexe, arrondi sur les côtés, rétréci en arrière, très finement et assez densément ponctué; angles postérieurs courts; sillons basilaires peu profonds. Elytres ovales, finement rugueux, ponctués-striés. Dessous d'un brun obscur. Pattes jaunes.

Longueur, 6 millimètres.

PALAWAN, Puerto Princesa. NEGROS, les montagnes Cuernos.

Espèce voisine de *C. unicolor* Candèze; pronotum plus court et plus convexe; ongles dentés.

Cardiophorus philippinus sp. nov.

Allongé, peu convexe; noirâtre, avec les côtés du pronotum, la base et les côtés des élytres jaunâtres, pubescence jaune. Tête plane, rugueuse, bord antérieur arrondi et rebordé. Antennes jaunes. Pronotum plus long que large, peu convexe, arrondi sur les côtés, rétréci en avant et en arrière, finement et densément ponctué; angles postérieurs court; sillons basilaires peu marqués. Ecusson concave. Elytres atténués en arrière, finement rugueux, assez profondément ponctués-striés. Dessous noirâtre avec les bords rougeâtres. Pattes jaunes.

Longueur, 7.25 millimètres.

PALAWAN, Puerto Princesa.

Espèce voisine de *C. anceps* Candèze, tête rugueuse, ponctuation du pronotum mieux marquée.

Cardiophorus banksi sp. nov.

Oblong, convexe; noir brillant; pubescence bicolore, brune sur la plus grande partie du corps et d'un blanc argenté formant des taches bien distinctes sur les côtés du pronotum et une bande transversale au delà de la moitié des élytres, remontant sur la suture. Tête peu convexe, finement et légèrement ponctuée, bord antérieur rebordé et avancé au milieu. Antennes noirâtres avec quelquefois la base jaune. Pronotum convexe, aussi long que large, rétréci seulement près des angles antérieurs, très finement pointillé; angles postérieurs non divergents; sillons basilaires bien marqués. Elytres graduellement rétrécis en arrière, fortement ponctués-striés. Dessous noir, moins pubescent. Pattes jaunes ou plus ou moins noirâtres.

Longueur, 4.25 à 5 millimètres.

LUZON, Laguna, Mont Maquiling. MINDANAO, Lanao, Iligan. PALAWAN, Puerto Princesa.

Espèce voisine de *C. nebulosus* Candèze, s'en distingue par les fascis pubescentes d'un blanc argenté, la bande transversale des élytres planés plus arrière et les stries beaucoup plus profondément ponctuées. Je la possède aussi de Pérak.

Je suis heureux de dédier cette espèce à M. le Prof. Charles S. Banks, chef du laboratoire d'Entomologie et de Zoologie du College d'Agriculture de la Université des Philippines à Los Baños.

Cardiophorus alvini sp. nov.

Oblong, peu convexe; noir brillant, pubescence jaunâtre. Tête très finement ponctuée, arrondie et rebordée en avant. Antennes brunes. Pronotum pas plus long que large, arrondi sur les côtés et rétréci en avant, finement et espacément pointillé; angles postérieurs courts, non divergents; sillons basilaires à peine distincts. Elytres profondément ponctués-striés. Dessous noir. Pattes noirâtres, avec les articulations et les tarses jaunâtres.

Longueur, 3.25 à 3.5 millimètres.

LUZON, Laguna, Mont Maquiling; Tayabas, Malinao.

Très voisin de *C. luzonicus* Eschscholtz, brièvement décrit en 1829; en diffère par le pronotum aussi long que large et la couleur noire des élytres.

Espèce dediée à M. le Dr. Alvin J. Cox, directeur du Bureau de Science à Manila.

Diploconus ciprinus Candèze.

Elat. Nouv. (1864), 1, 47.

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao.

Diploconus umbilicatus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 125.
angusticollis CANDÈZE, Compt. Rend. Soc. Ent. Belg. (1875), 126.
obscurus FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 447.

LUZON, Laguna, Mont Maquiling, Mont Linian; Tayabas, Malinao, Mont Banahao.

L'examen d'un certain nombre d'individus m'a permis de réunir ces trois espèces. La forme *D. angusticollis* s'applique vraisemblablement au mâle.

Diploconus philippinensis Fleutiaux.

obscurus FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 447.

LUZON, Tayabas, Mont Banahao.

Diploconus cantharus Candèze.

Elat. Nouv. (1893), 5, 48.

LUZON, Tayabas, Mont Banahao. MINDANAO, Misamis, Dapitan.

Diploconus nitidus sp. nov.

Allongé, peu convexe; rouge ferrugineux brillant avec le bord antérieur du pronotum, quelquefois la tête noirâtre et les élytres très légèrement obscurcis. Tête fortement ponctuée. Antennes brunâtres. Pronotum à peine plus long que large, à peine et graduellement rétréci en avant ou subparallèle et rétréci en rond près des angles antérieurs, assez fortement mais peu densément ponctué sur les côtés et en avant, très légèrement au milieu, sillonné au milieu, impressionné transversalement à la base; angles postérieurs aigus et bicarénés. Ecusson oblong. Elytres graduellement ou subgraduellement rétrécis en arrière, tronqués au sommet, ponctués-striés; interstries plans. Dessous et pattes de la même couleur ou plus ou moins obscurci.

Longueur, 8.5 à 9.75 millimètres.

LUZON, Tayabas, Mont Banahao.

Diffère de *D. philippinensis* Fleutiaux par sa couleur jaune, son aspect brillant, sa forme moins allongée, la ponctuation du pronotum irregulière, très légère et espacée sur le milieu.

Melanotus ebeninus Candèze.

Mon. Elat. (1860), 3, 305, 335; Compt. Rend. Soc. Ent. Belg. (1875), 126; FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 448.

LUZON, Laguna, Mont Maquiling. MINDANAO, Cagayan; Lanao, Iligan.

Melanotus scribanus Candèze var. **bakeri** var. nov.

Melanotus scribanus FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 448, nec Candèze.

LUZON, Laguna, Los Baños, Mont Maquiling.

Ponctuation du pronotum moins effacée au milieu, presque aussi forte que sur les côtés mais plus espacée.

Ludius hirsutus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 126; FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 448.

LUZON, Laguna, Mont Maquiling. PALAWAN, Puerto Princesa.

Ludius germanus var. a Candèze.

Ann. Mus. Civ. Genova (1894), 498.

MINDANAO, Butuan; Lanao, Iligan.

Espèce décrite de Sumatra.

Genus **LUZONICUS** novum

Corps allongé, déprimé. Front aplati, impressionné, ne formant pas de rebord saillant au dessus du labre. Mandibules saillants, bifides. Antennes très courtes à articles transversaux. Pronotum subélargi en avant; angles postérieurs divergents, briévement et obtusément carénés. Ecusson oblong. Elytres subparallèles. Sutures prosternales rectilignes. Hanches postérieures étroites, à peine et graduellement rétrécis en dehors. Pattes normales; tarses simples, ongles simples et assez grands.

Ce genre se place dans le voisinage de *Melanactes* et *Chrosis* (Corymbitinæ).

Luzonicus bakeri sp. nov.

Allongé, déprimé, parallèle; brun rougeâtre avec la seconde moitié des élytres noirâtre, pubescence jaune peu dense. Tête largement impressionnée au milieu, criblée d'une ponctuation forte et serrée. Antennes jaunâtres, ne dépassant pas la moitié du pronotum; articles transversaux à partir du quatrième. Pronotum plus long que large, légèrement bombé, sinué sur les côtés, arrondi et subélargi en avant, fortement et profondément ponctué. Ecusson plan, finement ponctué. Elytres assez largement arrondis en arrière, finement ponctués, profondément ponctués-striés. Dessous brun rougeâtre. Pattes jaunâtres.

Longueur, 13 millimètres.

LUZON, Laguna, Mont Maquiling.

Curieuse espèce déprimée dont le pronotum rappelle celui de certains *Pachyderes* (*P. africanus*, *P. bengalensis*, *P. niger*).

Agonischius bakeri sp. nov.

Elliptique, convexe; noir avec les élytres jaunes, pubescence roussâtre. Tête fortement ponctuée. Antennes noires. Pronotum plus long que large, sinueux sur les côtés, rétréci en avant, convexe, sillonné au milieu, fortement et densément ponctué sur les côtés, moins sur la ligne médiane; angles postérieurs aigus, divergents, bicarénés. Ecusson atténué en arrière, légèrement ponctué. Elytres très atténués en arrière, convexes, rugueux, fortement ponctués-striés. Dessous noir. Pattes brunâtres.

Longueur, 15 millimètres.

LUZON, Tayabas, Mont Banahao.

Espèce voisine de *A. corpulentus* Candèze, entièrement noire, sauf les élytres jaunes et les pattes brunâtres; pubescence rousse.

Glyphonyx posticus Candèze.

Compt Rend. Soc. Ent. Belg. (1875), 127.

LUZON, Laguna, Mont Maquiling. MINDANAO, Butuan.

Glyphonyx falsus Candèze.

Elat. Nouv. (1896), 6, 78.

MINDANAO, Butuan.
Espèce décrite de Palawan.

Glyphonyx erraticus Candèze.

Compt. Rend. Soc. Ent. Belg. (1875), 127.
posticus (?) FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 449 (nec Candèze).

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao. MINDANAO, Butuan.

Glyphonyx feneus Candèze.

Elat. Nouv. (1896), 6, 78.
erraticus var. FLEUTIAUX, Phil. Journ. Sci., Sec. D (1914), 9, 449 (nec Candèze).

LUZON, Laguna, Los Baños; Tayabas, Mont Banahao.

Glyphonyx ornatus sp. nov.

Allongé, assez convexe; noir brillant, pubescence jaune assez longue, pas très serrée. Tête ponctuée. Antennes jaune clair. Pronotum très brillant, ponctuation extrêmement fine et espacée; angles postérieurs jaunes. Ecusson oblong, noir. Elytres noires avec le tiers antérieur et une tache oblongue sur chacun en arrière jaunes; stries ponctuées et profondes. Dessous noir. Pattes blanchâtres.

Longueur, 3.25 millimètres.

LUZON, Laguna, Mont Maquiling; Tayabas, Mont Banahao.

Jolie espèce remarquable par sa forme étroite, son aspect brillant et les taches jaunes des élytres bien marquées. Voisine de *G. quadrimaculatus* Candèze.

SEA PRODUCTS OF MINDANAO AND SULU, I: FOOD FISHES AND SHARKS

By ALVIN SEALE

(From the Section of Fisheries, Biological Laboratory, Bureau of Science, Manila, P. I.)

TWO PLATES

During 1900-1902 I made a study of the fisheries of the Paumotu and Gambier Islands in the eastern Pacific. From these islands I went to Australia and to the Solomon Islands, paying especial attention to the pearl fisheries of these places. Afterward it was my privilege to make a short but interesting investigation of the fisheries in Japan. In 1908 my first preliminary study of the fisheries of Sulu waters was made while on the United States Bureau of Fisheries steamer *Albatross.* Extensive dredgings were conducted over the pearl and sponge beds of this region, but the results have not yet been published.

In 1909 I spent five months in Jolo, Siasi, and Sitanki in the study of the commercial fishes and pearl and sponge fisheries. In 1914 this work was again taken up, and six months were given to a preliminary survey of the pearl and sponge beds. This survey was continued during December, 1915.

It is obvious that these reports, considering the short time given to the actual field work—less than two years—are of a preliminary nature, and some of the conclusions may be changed in the light of future and more extended investigations.

In December, 1914, at the request of the Governor of the Department of Mindanao and Sulu, I was detailed for six months to study the pearl shells, fishing banks, and other sources of sea products in that region. In December, 1915, I was detailed to proceed to Zamboanga to coöperate with the Governor of the Department of Mindanao and Sulu in preparing drafts of proposed laws for the protection of marine Mollusca and sponges. In order to do this work intelligently, a second survey, similar to the first but less extended, was necessary. Eight weeks were consumed in the latter study, and laws were prepared which were subsequently passed at the session of the Legislature on February 4, 1916.

The Department of Mindanao and Sulu includes the greater part of the old Province of Mindanao (Plate I).

My investigations were made chiefly in the vicinity of Jolo, while additional information was gathered in trips to Zamboanga, Siasi, and Sitanki and to the Pearl Bank Islands and other islands.

A report was made to Governor Carpenter on the condition of the fisheries and pearl beds. Material has been taken from this report to prepare three papers, namely: I, Food fishes and sharks; II, Pearls, pearl shells, and button shells; III, Sponges, tortoise shell, corals, and trepang. The first of these papers is presented herewith.

FOOD FISHES

The waters of the Sulu Archipelago are abundantly supplied with a great variety of food fishes, ranging from the great sea bass of over 450 kilograms in weight to the small anchovy which is put up as a red condiment to use on curry. A catch with hook and line of over 90 kilograms of fish in half a day's fishing is recorded. There should be no lack of food where the sea yields so abundantly. Probably in no part of the Philippine Islands are food and game fishes more abundant or of better flavor than in the waters of Mindanao and Sulu.

THE FISHING BANKS

Certain localities in the waters of Mindanao and Sulu, where commercial fishes are abundant, have acquired a reputation as fishing banks. Such places are Sitanki, the banks off Caldera Bay, Sibuco Bay, the vicinity of Flecha Point, and Simor, Manucmanca, Tataan, Lahatlahat, Doc Can, Malicut, and Sulade Islands. These banks are usually well known and are frequented by the Moro fishermen.

The plankton is excessively abundant on these banks, and this no doubt attracts the small fishes. The large fishes follow to feed on the small fry.

CHIEF COMMERCIAL FISHES

It would require altogether too much space to enumerate all of the food fishes that are found in the waters of Mindanao and Sulu, but the most important are the following:

The mackerel family, Scombridæ, is represented by twelve species. All of them are excellent food fishes. They usually occur in large schools and are an important part of the local food supply. The most important of this family are the chub mackerels and several species known locally as *cavallas* or *alumahan;*

the Japanese mackerel, *salay salay* or *hasa hasa;* the Spanish mackerel or king fish, known as *tangili* or *tanguingue;* and the tuna, bonito, and albacore, known as *sobad* or *tulingan.*

The pompano family, Carangidæ, is represented by forty-six species. These range in weight from the round robin or decapatus, of 1 kilogram or less, to the giant cavalla or pompano, of from 30 to 45 kilograms. The larger species are well-known food and game fishes. The herring and sardine family, Clupeidæ, local name, *tamban,* is represented by about twenty species. According to the ruling of the United States Bureau of Fisheries, any member of this family may be legally labeled a sardine. Closely associated with this family are the anchovies, *talica* or *anacbat,* family Engraulidæ, which are abundant. These are used to make the red condiment for curry.

The sea bass family, Serranidæ, which includes all the sea bass and groupers called *lapo-lapo, garopa,* and *cuccut,* is a very important group of food fishes. This family includes some of the best and highest priced species. They range in weight from the beautiful, blue-spotted lapo-lapo of 0.25 kilogram to the giant sea bass, *Epinephalus lanciolatus,* of 800 kilograms.

The snappers, Lutianidæ, are represented in these waters by about fifty species. The most important of these are the gray snappers, *calumbang;* the red snapper, *moamia* or *bacbaan;* the dusky snapper, *camang-buhu;* and several smaller species called *dopa* and *mangagat.* All are excellent food fishes. Closely allied in general appearance to the snappers are the porgies, *cutamboc* or *gaud-gaud,* of which there are about twenty species.

The mullets or *banac,* family Mugilidæ, are of great commercial importance in the Sulu Archipelago. Great schools of mullets have been observed in the vicinity of Sitanki Island.

The barracudas, family Sphyrænidæ, constitute another important group of food and game fishes, known to the Moros as *lumbanac* or *bagasan.* There are few fishes that excel the young barracuda as a food fish. They are common along almost all reefs in the Sulu Sea. The large species furnish excellent sport for the rod and reel.

FISHING METHODS

The Moros capture fish by means of a large corral, provided they can afford to build one; otherwise they use small nets, traps, and spears. Comparatively few large nets are in use among these people.

An improvement on these methods of fishing would be the use of the purse net. However, the cost would preclude its use by most of the fishermen, and the amount of fish taken by such a net could not be disposed of with advantage, except perhaps at Jolo and Zamboanga. It requires an experienced crew of at least twelve men to operate a purse net.

I would advise an increase in the use of the gill net and the trammel net, with both of which I have had very good success in these waters.

THE SARDINE INDUSTRY

One hundred cans of Philippine sardines, which had been put up in the Bureau of Science, were sent to packers and to others who might be interested in this industry. The replies received regarding these samples were uniformly favorable, and the best authorities agreed that they were equal to the European sardine in every respect. The most practical way of starting this industry would be in connection with a tomato-catsup factory. Excellent tomatoes are grown here, and a catsup factory would afford a good market for tomatoes and stimulate their planting. There would then be two staple products to market—sardines and tomato catsup. Large quantities of these articles are imported each year.

The method of putting up sardines is comparatively simple; however, anyone starting a cannery without experienced help would probably encounter difficulties.

In brief, the method of preparing sardines is as follows:[1]

Catch the fish.
Rinse the fish well in salt or fresh water.
Spread on tables or a clean floor and sprinkle with a little salt.
Clean by removing heads and entrails.
Place the fish in brine of sufficient strength to float a potato, where they should remain until the salt "strikes in." This will take from one-half to one hour.
Rinse rapidly in two waters to remove scales, dirt, and excess of salt.
Dry in the open air by placing the fish, tails up, in shallow wire baskets, so that water will run out of the abdominal cavity. In good weather one hour or even less is sufficient for drying. In bad weather, dry indoors. The wire baskets full of fish should be hung up so that air may circulate freely through them.
Cook the fish in oil by immersing these wire baskets with the fish in them in boiling peanut or olive oil. They should remain in the oil about two minutes or until the tail fin breaks easily.
Hang up the baskets so that the oil will drain off, and leave until the fish are cool.
Pack the fish in tins.
Fill the packed tins with olive oil, tomato catsup, or whatever is desired; a few cloves, small peppers, or thyme may be used.

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[1] *This Journal, Sec. D* (1914), 9, 10.

Solder or clamp the covers so that they are absolutely air-tight.
Immerse the cans of fish in boiling water for two hours. This cooks the fish and softens the bones.
Remove the cans from the water, allow them to cool, and rub them in dry sawdust to remove all oil from the outside.
The sardines are then ready for the market.

SALT, DRY, AND SMOKED FISH

Practically the only method used in curing fish among the Moros is by drying and salting. The fish are cleaned, left in brine until the salt "strikes in," and placed in the sun to dry. The methods now in use can be greatly improved

During a recent inspection of the Sitanki fisheries some of the vats used in salting fish were found to be very filthy, and in many cases the brine was not strong enough. Probably this is why some of the prepared fish from Sitanki spoil so readily. An effort was made to impress upon those in charge the necessity for keeping their vats clean and trying to cure unspoiled fish only.

Methods of preparing fish in the tropics are described in one of my papers.[2]

PLANTING FISH IN MINDANAO

After a careful inspection of the Cotabato River system, I have advised the planting of carp in this watershed, my reasons for so doing being: (1) The obvious need for an abundant supply of cheap flesh food; (2) carp multiply so rapidly that they would soon supply the food; (3) Cotabato River is muddy and the local fish fauna poor, so no injury can result from the introduction of carp; (4) the carp is a favorite fish of Oriental people; more carp are sold in Hongkong than any other kind of fish.

A lake adapted to carp culture is located in Agricultural Colony No. 1. I advise that carp culture be introduced into this region and that Cotabato River be stocked from the lake. Additional black bass should be planted in Lake Lanao and in such other lakes as can conveniently be reached.

THE SHARK-FIN FISHERY

The returns from the shark fishery could be increased if all the products of the shark were more generally utilized.

In the northern part of the Philippine Islands nothing but the fins of the shark are saved; among the Moros certain of the sharks are used for food, but the liver and the skin are utilized nowhere in the Philippine Islands. The liver of the shark is rich in oil, and shark skin makes excellent leather for certain uses. From it are manufactured the most expensive scabbards and coverings for sword grips, certain expensive Morocco bindings, coverings for jewel boxes, etc. The crude skin is also made into rasps for cabinet makers. A recipe for tanning shark skin was given in a previous paper.[3]

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[2] *This Journal, Sec. D* (1914), 9, 1.

In some countries sharks are canned and used as food; in other countries they are manufactured into fertilizer. They seem to fill both uses equally well.

KINDS AND VALUES OF SHARK FIN

In general terms, shark fin is called white fin or black fin, although none of the fins are perfectly white or perfectly black. The so-called white fin is drab, and the black fin is dark gray. All of the fins of the shark are used for soup; they are divided into several groups of different values, depending upon the color, size, and variety. The ordinary commercial classification of shark fin and the present market values of the different classes are as follows:

Large white-spotted fin (*Plate II, fig. 1*).—This is the *mano-mano* of the Moros and the *boon leong sit* of the Chinese. This fin is drab with scattered white spots; the dorsal fin of this variety is from 25 to 30 centimeters high. This is the most valuable of all the shark fins, being worth 120 pesos[4] per picul.[5] I was told by a reliable Chinese merchant that soup made from this fin was sold for 5 dollars (Hongkong) per cup in Hongkong. It is believed to possess especially invigorating properties.

Large white fin; chu sit (*Plate II, fig. 2*).—The chu sit is similar to the boon leong sit in color and size, but it has no white spots. Its value is from 50 to 60 pesos per picul.

Small white-spotted fin.—This kind of fin has the same Chinese name as the large white-spotted fin and consists of fins from the small or young sharks of the same species. The value is 60 pesos per picul.

Small white fin; peh sit (*Plate II, fig. 3*).—This fin is drab and without white spots; its value is about 55 pesos per picul.

Small white fin (*Plate II, fig. 4*).—This fin is called *khiam sit* by the Chinese and *pindong* by the Moros. It is the poorest grade of the white fins, being small, rough in texture, and valued at only 30 pesos per picul.

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[3] *This Journal, Sec. D* (1911), 6, 312.

[4] One peso equals 100 céntavos Philippine currency, equals 50 cents United States currency.

[5] One picul equals 63.25 kilograms.

Large black fin (Plate II, fig. 5).—This fin is called *tua sit* by the Chinese and *tamamambojee* by the Moros. It is the largest size of the dark-colored fins. Most of the shark fins secured in the Philippines belong to this group. The best grade is worth 80 pesos per picul.

Small black fin; oh sit.—This class consists of the young and small fins of the species that yields the large black fin. These fins are valued at 12 pesos per picul.

Small black fin (Plate II, fig. 7).—This small black fin is called *seow oh sit* by the Chinese and *galambu* by the Moros. This is really a gray fin with dark margins. It is valued at 12 pesos per picul.

Small black-tipped fin (Plate II, fig. 6).—This fin is called *oh ku sit* by the Chinese and *totong* by the Moros. It is gray with a jet-black tip. Its value is 18 pesos per picul.

During 1913 the Department of Mindanao and Sulu exported shark fins valued at 17,408 pesos, and during the first four months of the present year, 1914, the fins exported were worth 7,616 pesos.

There is little labor in preparing fins for the market. The fin is cut from the body, the cut portion is well salted or dusted with lime, and the fin is dried in the sun. When dry, the fins are bailed and shipped. The chief market is Singapore; from there they are transshipped to China.

There are about thirty-five species of sharks in Philippine waters. The fins of practically all of these are of commercial value. These sharks range in size from the small dog fish, only 30 centimeters long, to the big gray sharks, which may be 6 meters or more in length. Most of the tribe are harmless in so far as attacking man is concerned, but the great gray shark, *Carcharias gangeticus* Müller and Henle, and the tiger shark, *Galeocerdo tigrinus* Müller and Henle, have evil reputations and should be avoided.

Several of the Philippine sharks take the trolling spoon freely and give excellent sport; this is especially true of the mackerel sharks.

ILLUSTRATIONS

PLATE I

Map of the Philippine Islands, showing the location of the Department of Mindanao and Sulu.

PLATE II. COMMERCIAL SHARK FINS

FIG. 1. Large white-spotted fin (*boon leong sit*).
2. Large white fin (*chu sit*).
3. Small white fin (*peh sit*).
4. Small white fin (*khiam sit*).
5. Large black fin (*tua sit*).
6. Small black-tipped fin (*oh ku sit*).
7. Small black fin (*seow oh sit*).
8. Fin prepared for cooking.

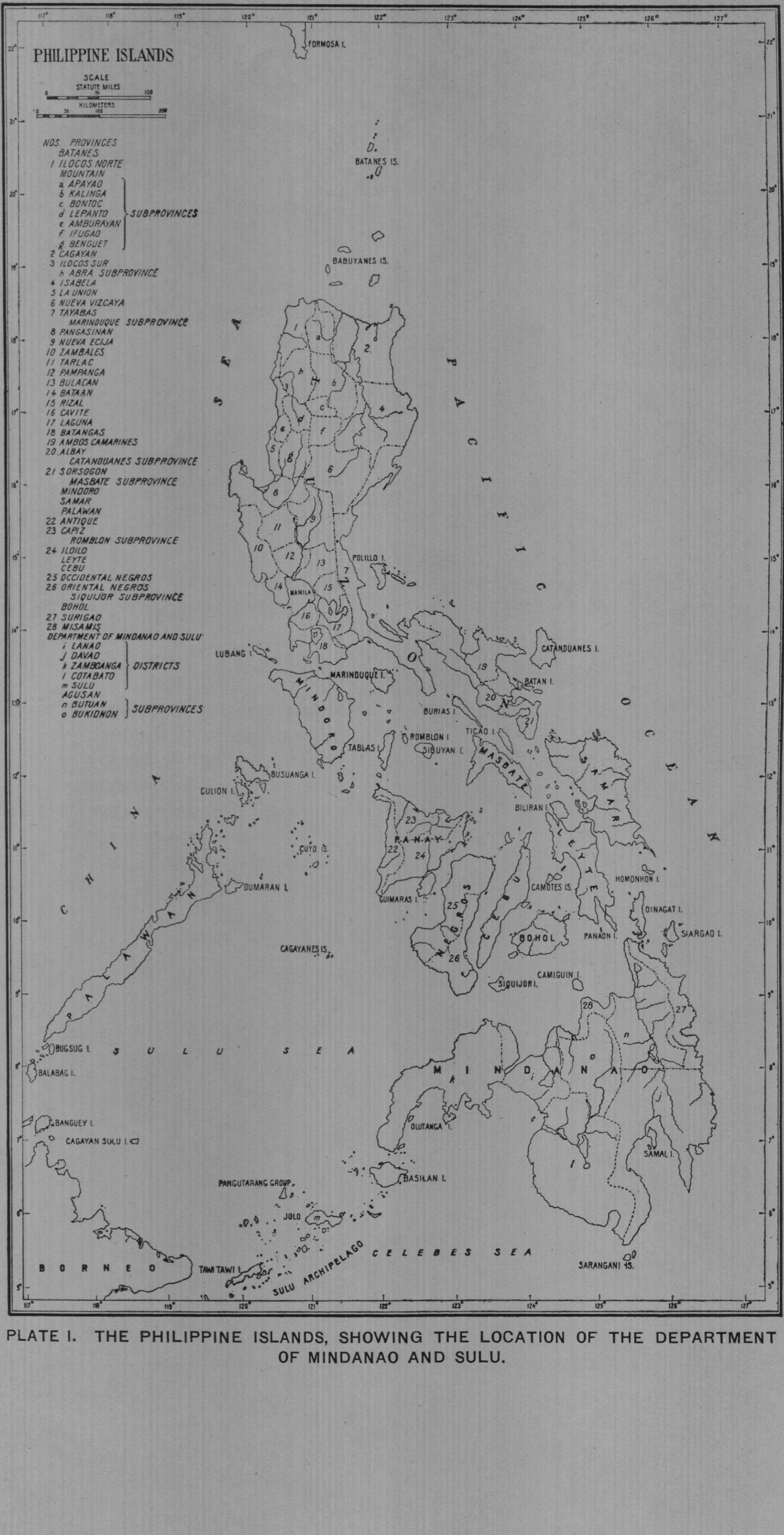

PLATE I. THE PHILIPPINE ISLANDS, SHOWING THE LOCATION OF THE DEPARTMENT OF MINDANAO AND SULU.

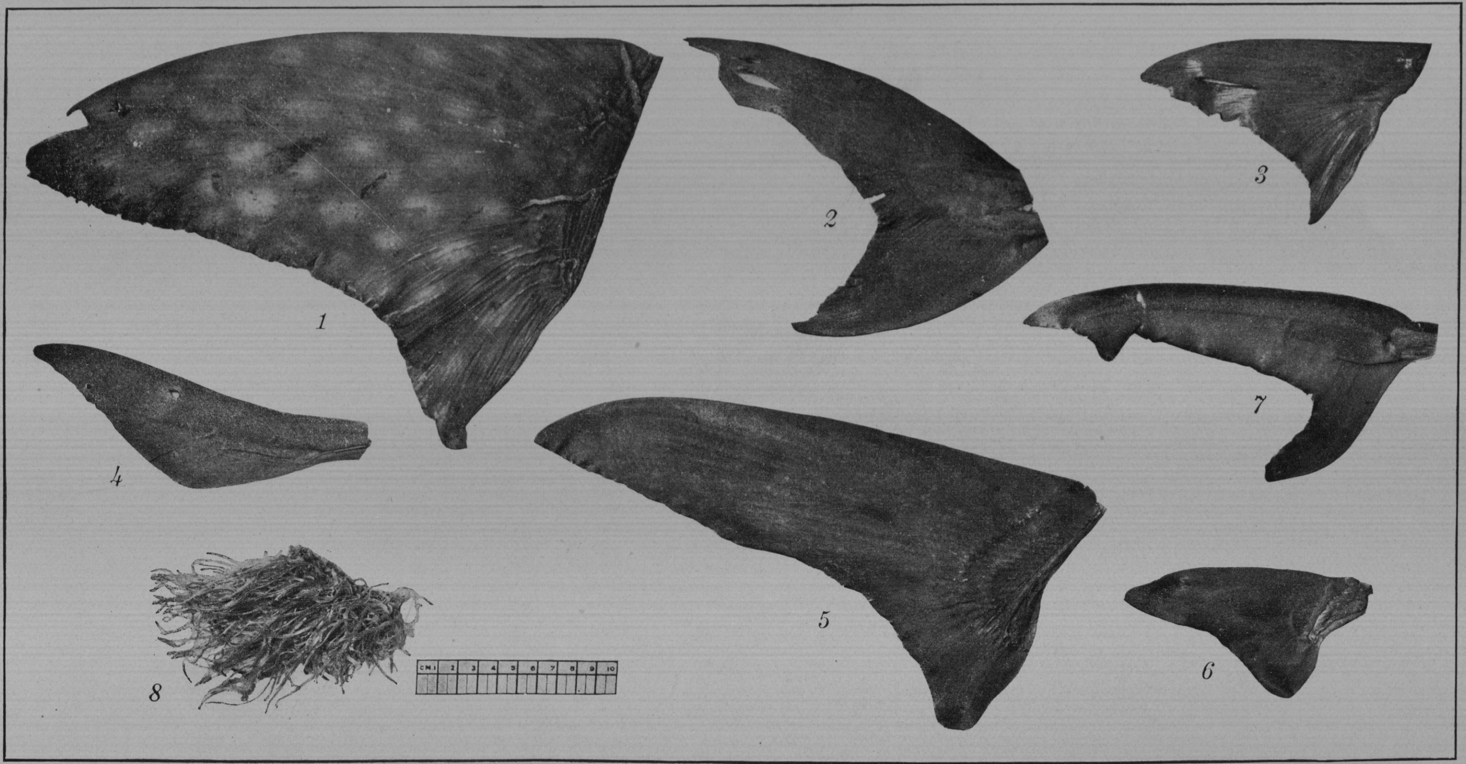

PLATE II. COMMERCIAL SHARK FINS.

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